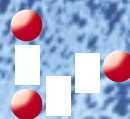




# FDR®

TOTAL STORAGE  
MANAGEMENT SYSTEM

V5.2



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# FDR<sup>®</sup>

FAST DUMP RESTORE

USER DOCUMENTATION

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# FAST DUMP RESTORE (FDR) USER MANUAL

## VERSION V5.2

We at INNOVATION DATA PROCESSING have the pleasure of presenting to you the INNOVATION DASD MANAGEMENT User Manual.

### PURPOSE OF THE GUIDE

The purpose of this guide is to provide you with the information to use and understand FAST DUMP RESTORE (FDR). FDR is comprised of six functional components: FDR (FAST DUMP RESTORE), DSF (DATA SET FUNCTIONS), SAR (STAND ALONE RESTORE), CPK (COMPAKTOR), ABR (AUTOMATIC BACKUP & RECOVERY) and FDRREORG. ABR is a cost options to FDR.

FAST DUMP RESTORE (FDR) is a utility program designed to dump and restore DASD volumes. DATA SET FUNCTIONS (DSF) is a utility program designed to dump and restore data sets. FDRCOPY is a utility program designed to copy or move data sets or groups from DASD to DASD. FDRREORG provides an easy and automated method of reorganizing VSAM, IAM and PDS data sets.

STAND ALONE RESTORE (SAR) is a stand alone utility designed to backup or restore DASD volumes when an operating system does not exist.

COMPAKTOR (CPK) is a utility program designed to reorganize DASD volumes.

AUTOMATIC BACKUP & RECOVERY (ABR) is a series of disk management programs which provide a complete DASD space management facility. It is designed to be used in conjunction with FAST DUMP RESTORE (FDR) and COMPAKTOR (CPK).

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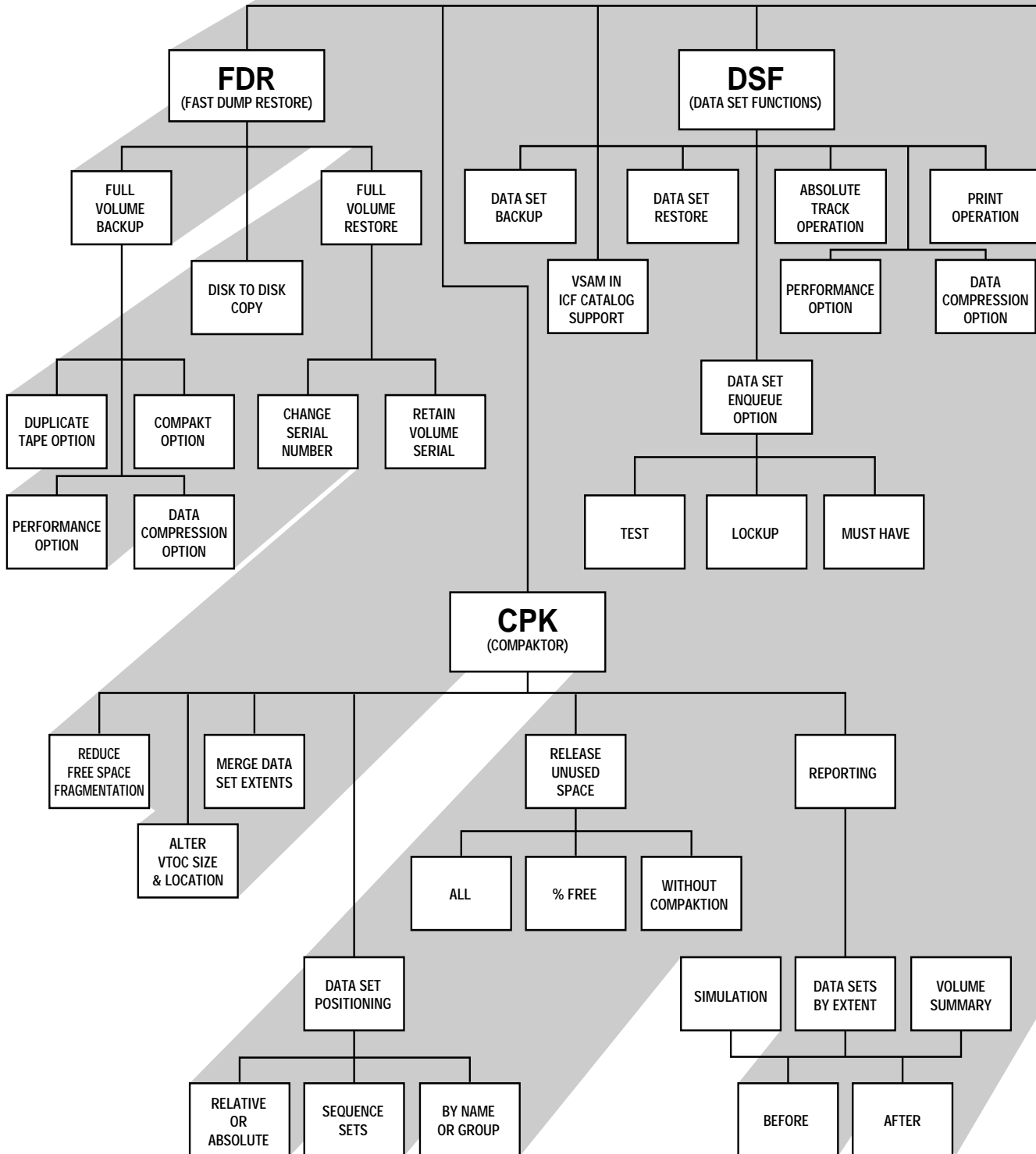
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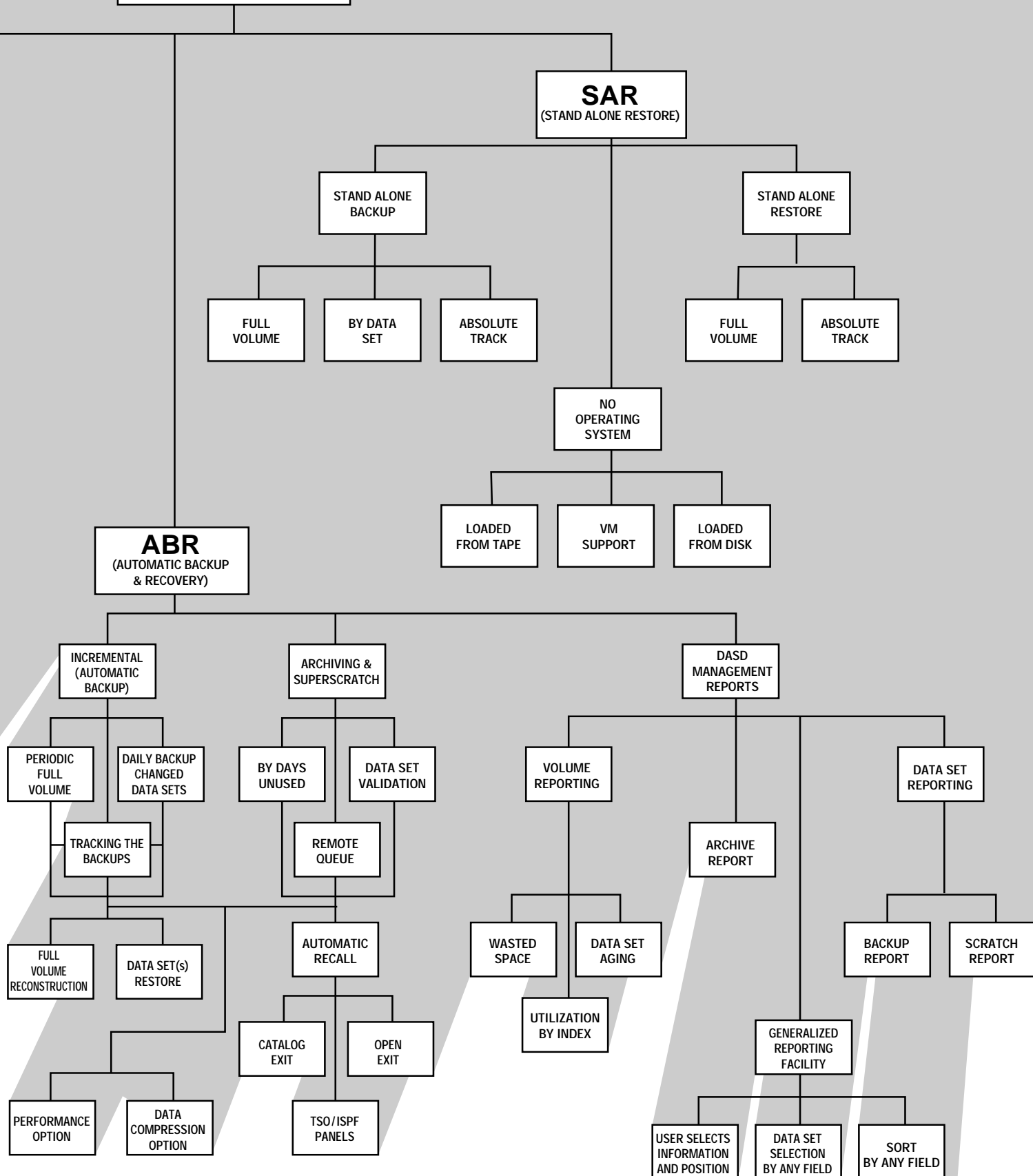
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**THE DASD  
MANAGEMENT TEAM**

# FDR







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\*Sections 90.11, 90.12, 90.12B, 90.13, 90.14, 90.15, 90.17, 90.18, 91.10 and 91.11 are documented only in the machine-readable version of the manual

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**01.01 INTRODUCTION AND ORGANIZATION OF GUIDE**

- APPLICABILITY** This version of the FAST DUMP RESTORE User Guide applies to Version 5.2 of FDR.  
This version of the user manual applies to Version 5.2 Level 60:
- FORMAT OF THE GUIDE** The user guide is divided into sections. Within sections, searchwords may appear near the left margins. Each page displays its section number at the top right corner. Page numbering is sequential within each section.
- LIST OF SECTIONS** The following is a list of the sections contained within this manual.
- SECTION 01 — INTRODUCTION AND TABLE OF CONTENTS
  - SECTION 10 — FAST DUMP RESTORE (FDR)
  - SECTION 20 — DATA SET FUNCTIONS (DSF)
  - SECTION 21 — FDRCOPY
  - SECTION 25 — FDRREORG
  - SECTION 30 — STAND ALONE RESTORE (SAR)
  - SECTION 40 — COMPAKTOR (CPK)
  - SECTION 50 — AUTOMATIC BACKUP & RECOVERY (ABR)
    - 51 — ABR ARCHIVE
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    - 55 — ABR MAINTENANCE UTILITIES
    - 56 — ABR PROCESSING UNDER ISPF
  - SECTION 80 — MESSAGES AND CODES
  - SECTION 90 — INSTALLATION AND OPTIONS
  - SECTION 91 — GLOBAL OPTION CHANGE FACILITY
  - SECTION 92 — FDR INTERACTIVE INSTALLATION PROCEDURE
- IMPROVING THE GUIDE** We have tried to make this manual as complete, precise and error free as possible. However, in spite of our best efforts, errors and vague explanations may have crept in. Should you encounter any of these, we would appreciate your corrective criticism. It is primarily through your feedback that we can improve this manual.
- EXAMPLES** All examples and Job Control Language statements shown in this manual are for ILLUSTRATIVE PURPOSES ONLY! The user is expected to modify them as required by his/her environment.

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**01.02 SUMMARY OF MODIFICATIONS FOR V5.2 LEVEL 60**

**SMS EXPIRATION DATES** ABR now supports a new operand, SMSEXPIRE=YES, for DUMP TYPE=ARC. This operand supports the attributes of the SMS management class relating to the retention of migrated (ARCHIVED) data sets, such as "LEVEL 1 DAYS NON-USAGE". It causes the COPY1 and COPY2 expiration dates recorded in the Archive Control File to be calculated using these management class attributes. The FDRTSEL and FDRARCH utilities have been enhanced to support this new option. Details are in [Section 52.50 in the subsection Archive Expirations](#), and, for FDRTSEL, in [Section 10.15](#), both revised in August 1996.

**SMS MANAGEMENT CLASS SELECTION** ABR now allows you to select SMS-managed data sets by their SMS management class name during ARCHIVE backups and SUPERSCRATCH. On the DUMP statement, MGMTCLAS=(class1,class2,...) will cause ABR to process only data sets whose management class is among those specified. This allows you to segregate the processing of selected management classes into various ABR jobs. SMSMANAGE=YES must also be specified, so the final selection of the data sets still depends on management class parameters as described in [Section 52.50](#).

A version of this support, with slightly different syntax, has been available since V5.2 level 36; the old syntax (multiple MGMTCLAS= parameters) is still accepted.

**BACKUP EXPIRATIONS** For ABR backups, ABR will now save the expiration date of the most recent full-volume backup separately for COPY1 and COPY2; these dates are stored in the ABR model DSCB on each DASD volume. Previously, if both copies were created, only the COPY1 expiration was saved. This change is most significant if you then run daily incremental backups of the same DASD volumes with no expiration or retention specified, causing ABR to set the incrementals to expire on the same day as the most recent full-volume backup. If you create a COPY1 and COPY2 incremental, ABR will now set the expiration of each to the expiration of the corresponding full-volume backup (previously, it set both copies to expire on the same day as the full-volume COPY1).

**YEAR2000 SUPPORT** V5.2 level 60 contains most required changes to support years beyond 1999. This includes internal changes (such as calculations and date checking) and external changes (such as reporting and parameters). The status of YEAR2000 support by component is:

FDR, DSF and SAR – complete as of V5.2 level 50

CPK – complete as of V5.2 level 50

FDRREORG – complete as of V5.2 level 50

FDREPORT – complete as of V5.2 level 60

ABR – complete as of V5.2 level 60 except for GEN=CURRENT full-volume restores and some FDRABRP reports

The final YEAR2000 changes will be in ABR V5.3.

**MAGSTAR SUPPORT** ABR will support the IBM Magstar (3590) tape cartridge drive when it becomes available. V5.2 level 60 is required to support the Magstar in "native" mode (attached to a 3590 control unit). The interim version of the Magstar, which attaches to a 3591 control unit and looks like a 3490E to the operating system, is supported by any level of ABR V5.2. FDR, COMPAKTOR and FDRREORG are not sensitive to the type of tape drive and support both versions of the Magstar in V5.2 level 30 and above. SAR also supports the Magstar as a 3490 on V5.2 level 30 and above but level 60 is required to be able to enter "3590" as a tape device type.

**VOLUME SIZE SUPPORT** IBM APAR OW22040 ( and related APARs) introduce changes in the VTOC to properly indicate the true size of the volume in all circumstances; this fixes various problems with RAMAC volumes and similar devices which have no alternate tracks. These APARS apply to DFSMS 1.1, 1.2, and 1.3 and were available in September 1996. FDR and ABR full-volume restore and COMPAKTOR have been updated to fully support the changes introduced by these APARS.

**01.02 SUMMARY OF MODIFICATIONS FOR V5.2 LEVEL 50****4-DIGIT  
DEVICE  
ADDRESSES**

All components of FDR have been enhanced to support 4-digit device addresses.

**UCBS ABOVE  
THE 16MB  
LINE**

Installations running DFSMS 1.3 with ESA 5.2, or OS/390, have the option of placing disk and tape UCBs above the 16MB line. These UCBs are now supported by all components of FDR.

**EXTENDED  
FORMAT  
DATA SETS**

All components of FDR now support Extended Format (EF) data sets. EF data sets are SMS-managed data sets, including:

- Striped sequential data sets (available with DFSMS 1.1)
- Single Striped sequential data sets (available with DFSMS 1.2)
- Compressed sequential data sets (available with DFSMS 1.2)
- Compressed KSDS clusters (available with DFSMS 1.2)
- Extended Addressing KSDS clusters using relative CI addressing (supports clusters over 4GB, available with DFSMS 1.3)

All of the above are supported by OS/390.

EF data sets have certain hardware requirements; during an FDR data set restore, FDR will allocate and restore each stripe or volume of an EF data set separately, and will insure that the hardware requirements are met.

There are no special procedures for copying or restoring EF data sets, other than insuring that your ACS routines will assign SMS storage groups that are capable of handling the EF data sets and have sufficient available volumes. FDR will always restore or copy the EF data set to the same number of volumes it originally occupied, as it does with all other multi-volume data sets.

This is an example of an FDRCOPY job to copy an EF data set to a new name. Since CATDSN= is used to select the input data set and its volumes, this will work no matter which type of EF data set is involved or how many volumes it resides on.

```
//COPYEF EXEC PGM=FDRCOPY, REGION=2M
//SYSPRI NT DD SYSOUT=*
//SYSI N DD *
COPY TYPE=DSF
SELECT CATDSN=PROD. STRI PE. DAT, NEWI =PROD2
```

**EXTENDED  
ATTRIBUTE  
DATA SETS**

Extended Attribute (EA) data sets are supported. EA data sets are SMS-managed data sets with additional attribute information stored in the VVDS, such as NFS (Network File System) data and accounting information. In previous releases, a restore/copy/move of an EA data set would simply discard the EA data, but it is now preserved.

**MULTI-LEVEL  
ALIAS  
CATALOGS**

The FDR catalog processor, used for CATDSN= processing as well as FDREPORT and FDRARCH catalog access, has been enhanced to fully support Multi-Level Alias (MLA) catalogs.

**COMPAKTOR  
ENHANCE-  
MENTS**

CPK now supports Extended Addressing KSDS clusters (capable of >4GB).

It can now relocate data sets with over 60 extents.

SMF data sets (SYS1.MANx) are automatically made ineligible for space release.

**SMS MULTI-  
VOLUME  
DATA SETS**

When FDRDSF or FDRABR backs up multi-volume SMS data sets, the original SMS class names will be preserved on the backup for ALL volumes, not just the first. So, when restoring those data sets, the original class names will now be passed to the ACS routines for all pieces of the data set. This will improve the automation of the restore of such data sets, especially for auto-recall. This may be especially useful for installations using TMM (Tape Mount Management) technology.

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## 01.02 CONTINUED . . .

**SMS MESSAGES DURING RESTORE** When FDRDSF or FDRABR allocates output data sets during RESTORE, if an allocation failure generates messages from SMS, they will be displayed just before the FDR message (such as FDR156 or FDR157) for the failure. This will include messages generated by WRITE statements in the ACS routines. The SMS messages will be prefixed with the new FDR message number FDR162. This will often make the diagnosis easier for allocation failures due to SMS errors or errors in the ACS routines. However, when trying to interpret an allocation error, be sure to look at the FDR error messages as well as the SMS messages.

**DATA SET ENQ DURING RESTORE** During a data set restore, data sets that are allocated by FDR will be ENQed if DSNENQ=USE or DSNENQ=HAVE is specified or defaulted. If the ENQ cannot be obtained, the data set will still be restored and no error message will be generated. This ENQ is only to prevent other tasks (including other FDR or COMPAKTOR jobs) from using the data set until it is completely restored. DSNENQ=USE processing will be used for data sets allocated by FDR even if DSNENQ=HAVE is specified; it will never issue an FDRW27 message. ENQ on preallocated output data sets will continue to work as it has in previous releases.

**FDRARCH ENHANCEMENTS** FDRARCH (the ABR archive utility) has been enhanced to include:

- performance improvements
- four digit year support
- new ADATE specification that supports the time a data set was backed up as well as the date (application backup only)
- enhanced SORT-based REORGanize command
- new SORT-based SORECATLOG command
- new RECATALOG option to improve auto-recall performance
- full data set name masking

For complete details on the FDRARCH enhancements, see the member FDRARCH in the FDR ICL, or execute:

```
//ARCHHELP EXEC PGM=FDRARCH
//SYSPRI NT DD SYSOUT=*
HELP ALL
```

**FDREPORT ENHANCEMENTS** FDREPORT (the generalized report writer) has been enhanced to include:

- read and report on extract files created by all prior versions
- four digit year support (for display or selection)
- four digit unit addresses
- ability to select on unit address ranges (e.g., UNIT>140 UNIT<145)
- selection of PDSs based on member name
- sort on ABR backup information
- full disk/tape selection
- new DATATYPE=TVTOC to report on the content of backup files.

For complete details on the FDREPORT enhancements, see the member FDREPORX in the FDR ICL, or execute:

```
//REPThelp EXEC PGM=FDREPORT
//SYSPRI NT DD SYSOUT=*
XHELP ALL
```

CONTINUED . . .

**01.02 CONTINUED . . .****FDRREORG  
ENHANCE-  
MENTS**

FDRREORG automates and improves the performance of reorganizing IAM VSAM files (in addition to compressing PDS's).

FDRREORG offers a number of new features to further improve the performance of reorganizing large IAM (enhanced format) and VSAM files.

PARALLEL SEQUENTIAL READ for Multi-Volume files reduces reorg time by 30 to 70%.

Many users have IAM and VSAM files that exceed 1 GB in size. Some IAM files exceed 10GB. Reorganizing large files can take a very long time reducing their availability to online systems.

FDRREORG Parallel option backs up each volume of a multi-volume file concurrently to separate tape or disk files (up to a specified maximum). For example if a file resides on 4 DASD volumes the backup time can be reduced by 75%.

FDRREORG (as a default) bypasses the de-compression of IAM enhanced format files reducing reorg time by 20 to 40%.

FDRREORG now supports the delete and re-define of IAM files during reorganization.

For other enhancements, see member FDRREORG in the FDR ICL.

**FDRTSEL  
ENHANCE-  
MENTS**

FDRTSEL (the ABR Archive copy driver) has been enhanced. The primary enhancement is a function called ARCEDIT, which can be used to copy portions of a backup file instead of the entire backup. This is primarily used to consolidate Archive tapes, by copying only those ARCHIVED data sets within the backup file that are still recorded in the ARCHIVE Control File, dropping the obsolete ARCHIVED data sets that have been purged from the ARCHIVE control file.

For details, see member FDRTSEL in the FDR ICL.

**SAR** SAR no longer requires the use of the INTERRUPT or PSW RESTART functions to recover from errors (such as disk I/O errors). These errors now present a message to which the operator can respond CONTINUE (to ignore) or TERM (to terminate). PSW RESTART can still be used to take a memory dump of SAR at any time if a hardcopy device is assigned.

SAR will now preserve the size of the output disk as indicated in the Format 4 DSCB in the VTOC of the output disk before restore. This supports non-standard sized disks, and devices such as VM minidisks and RAMAC disks which have no alternate tracks.

Previously, while trying to identify a console device, SAR might reset/reload 37x5 communication controllers, affecting active networks. It will no longer do so.

SAR can now use the SCLP console function as a console, when no locally-attached 3270-type MCS console is available. The SCLP console function includes the OPRMSG frame on the hardware console of most ES/9000 CPUs and the "Operating System Message" function on the HMC (Hardware Management Console) on IBM 9672 Parallel Systems. Please contact Innovation for assistance if you plan to use the SCLP console function.

**01.02 SUMMARY OF MODIFICATIONS FOR VERSION 5.2 LEVEL 30****Changes added to all products**

**3390-9 SUPPORT** The IBM 3390 Model 9 DASD, announced in June 1993, is supported. The 3390-9 has a 3390 geometry (56664 bytes/track and 15 tracks/cylinder) but has 10,017 cylinders, triple that of a 3390 Model 3. Because this is the first IBM disk ever to have over 64K tracks, DFP changes are also required to support it; it is supported only by DFSMS/MVS 1.1.0, MVS/DFP 3.3.2 and MVS/DFP 3.2.1. FDR V5.2 level 30 or above is required to support this disk.

**3990-6 CONTROLLER** IBM also announced a new 3990 Model 6 Storage Control Unit. No changes in FDR are required to support it.

**Changes added to COMPAKTOR**

**FAST COMPAKTion** COMPAKTOR has a new Fast COMPAKTion option, which will COMPAKT a volume in-place without requiring an FDR backup to be taken. Fast COMPAKTion works by moving data around on the volume directly, track-to-track, until all data is in its desired location. It is invoked by the TYPE=FASTCPK operand on the COMPAKT statement.

FASTCPK achieves the same level of free space consolidation and reduction of multi-extent datasets as a traditional COMPAKTion requiring an FDR backup, without compromising the integrity of your data. FASTCPK includes an automatic recovery function which allows COMPAKTOR to be restarted if the operating system or the job fails during the COMPAKTion.

FASTCPK performs the reorganization in 50 to 90% less elapsed and CPU time compared to a COMPAKT-from-backup. It can COMPAKT many volumes in a single step with simple control statements such as

```
CPK TYPE=FASTCPK , VOL=(TSO*,WORK*)
```

Fast COMPAKTion is designed to be run against active volumes. It will ENQ all datasets to determine which datasets are active; they will not be moved.

**FASTCPK will run in a fraction of the time of competing products, and will produce better results (fewer free space areas).**

**CANCEL PROTECTION** The most common cause of interruptions in COMPAKTOR jobs is cancellation by the operator. Since this usually leaves the volume in an unusable state, COMPAKTOR V5.2 level 30 includes CANCEL protection. If a CANCEL is issued during the time when COMPAKTOR is actually modifying the volume, an operator message is issued, giving the operator the choice of ignoring the CANCEL, ending gracefully at the end of the current volume, or honoring the CANCEL.

**COMBINED SUMMARY** A new combined summary will be printed at the end of a CPK step, displaying a 2-line BEFORE and AFTER summary for each volume processed in the step, sorted by volser. It also shows if the volume completed normally, and displays the elapsed time required to process the volume (for a simulation of FASTCPK, it shows estimated elapsed time).

**FRAGMENTATION INDEX** COMPAKTOR will now calculate the IBM Volume Fragmentation Index for each volume mapped or COMPAKTed, according to an IBM formula. It is displayed in the summary report and the new combined summary. Before and After values are printed for SIMulations and COMPAKTions. You can conditionally COMPAKT a volume based on its fragmentation index.

**VOLUME EXCLUSION** Special Entries in the COMPAKTOR Unmovable Table may be used to exclude certain volumes or groups of volumes from COMPAKTion or Space Release.

**COMPAKTOR RECOMMENDATIONS** A new section in the manual, [Section 40.26](#), contains Innovation's recommendations for the usage of COMPAKTOR. It includes recommended control cards for weekend and weekday execution.

**ISPF SPACE RELEASE** A new option (R) appears on the main menu of the ABR ISPF dialogs, which can be used to invoke COMPAKTOR Space Release (TYPE=RLSE) in either simulation or real mode, in foreground (interactive) or background (batch job) mode.

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## 01.02 CONTINUED . . .

**Changes added to COMPAKTOR – Continued . . .**

**UPDATING** For Fast COMPAKTion (TYPE=FASTCPK) and space release (TYPE=RLSE) COMPAKTOR will  
**VTOC INDEX** now update the free space maps in the VTOC INDEX (if it is active on the volume) directly, without disabling and rebuilding the VTOCIX. Not only is this more efficient, it avoids problems that occasionally occurred in shared DASD configurations.

**SMS STORAGE** For Fast COMPAKTion (TYPE=FASTCPK) and space release (TYPE=RLSE) COMPAKTOR will  
**GROUP** now accept the names of SMS Storage Groups. All volumes included in the definitions of those  
**SUPPORT** groups will be processed.

**ENQ** For Fast COMPAKTion (TYPE=FASTCPK), the performance of the ENQs issued for the DSNENQ=  
**PERFORM-** option has been improved. Since DSNENQ=USE is the default for TYPE=FASTCPK, causing  
**ANCE** COMPAKTOR to ENQ on hundreds or thousands of data sets, this will significantly reduce elapsed time, especially under cross-CPU ENQ products like MIM and GRS.

**Changes added to FDRREORG**

**VSAM** FDRREORG supports clusters with alternate indexes (AIXs).  
**ENHANCE-** It can automatically recover from most VSAM out-of-space failures.  
**MENTS** The RECOVER command has been enhanced to support the redefine of VSAM KSDSs. FDRREORG now provides a facility to increase the space allocation of selected VSAM clusters by a user-specified percentage.

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## 01.02 CONTINUED . . .

**Changes added to ABR**

**DYNTAPE2** The DYNTAPE2 option for restores is now supported whenever DYNTAPE was supported. DYNTAPE2 will allocate TWO tape drives for restore from backup or ARCHIVE; whenever a given backup file is multi-volume, it will call for 2 tapes to be mounted, and will pre-mount subsequent tapes while continuing to read the current tape, eliminating rewind/mount delays.

**ARCHIVE ENHANCEMENTS** ABR can now ARCHIVE from a given disk volume at least 255 times on the same day, up from 36 times in previous releases. A new naming convention will be used for the ARCHIVE backup file if you exceed 36 ARCHIVES on a volume on a given day ([See Section 52.05 for the format](#)).

To improve recall performance, ABR will now break large ARCHIVE backup files into several smaller files. When processing a given disk volume, if more than a threshold of tracks have been selected from a given disk volume (4096 tracks, by default), ABR will create one or more additional backup files to hold the excess data. Since the backup files are smaller, recall performance will be improved. Individual datasets will not be split across backup files. The new MAXBTRKS= operand can be used to change the threshold.

The limitation that a given ARCHIVE backup file could not exceed 5 tape volumes has been lifted; they may now have up to 20 volumes. Since the ARCHIVE Control File still has room to record only 5 volumes, any backup file exceeding 5 volumes will be cataloged to record the additional volumes. Because of the MAXBTRKS enhancement just described, backups exceeding 5 volumes should occur only when processing very large datasets.

**APPLICATION BACKUP ENHANCEMENTS** Application Backup (high-speed backup of a set of application-oriented datasets) has been significantly enhanced and simplified in V5.2 level 30. In previous releases, Application Backup was a special case of ARCHIVE, specifying DUMP TYPE=ARC,SCRATCH=NO and optionally some other operands. Special procedures were required to format a Control File.

Now, Application Backup is specified by DUMP TYPE=APPL and requires very few additional operands. It is now a one step procedure; formatting of a Control File (still required to record the backups) can be automatically done in the Application Backup step.

The name of the Control File and the names of the optional backup of that control file on the Application Backup tapes are totally under user control, which simplifies setting up Application Backup.

Application Backup is now documented in [Sections 51.20-51.28](#) in the back of the ARCHIVE Section. It is designed to be more easily understood by an application programmer who may not be as familiar with ABR.

Existing Application Backup jobstreams, as documented in [Section 52.08](#) in earlier FDR manuals, will continue to run without change.

**SRS ENHANCEMENTS** The ABR SRS dialogs (ISPF dialogs for selecting and displaying datasets from catalogs, volumes, and ARCHIVE Control Files, introduced in V5.2) have been enhanced:

- Use of FDR/ABR commands can be restricted by TSO userid
- a new RELEASE command will release space in PS/PO datasets
- DELETE is supported for uncataloged datasets.
- New customizable FDR Function commands

**FDREPORT ENHANCEMENTS** The STORGRP= operand on XSELECT statements now accepts an asterisk to select groups of SMS storage groups, e.g., STORGRP=PROD\* or STORGRP=\*

All fields on XSELECT/XEXCLUDE statements may be specified with an unlimited number of multiple values, e.g., LRECL=(80,120,350). Previously this was true for only certain fields and there were limitations on the number of values specified. This will simplify some statements, such as CATALOG=(NO,ERR,UNK) to select all uncataloged or improperly cataloged datasets.

New fields are available in the volume report, providing various byte values (bytes allocated, bytes/cylinder, etc.).

## 01.02 CONTINUED . . .

**SPECIAL CONSIDERATIONS FOR USERS OF PRIOR VERSIONS**

**CUSTOM ZAPS** If you were given custom zaps to prior versions, please do not attempt to reapply them. Contact Innovation for assistance if you still need the function provided by the zap.

**MACHINE-READABLE MANUAL** File 3 of the installation tape contains a machine-readable version of the FDR V5.2 manual. [See Section 90.06](#) for details on loading, printing and browsing this manual. Some features of limited interest are documented *only* in the machine-readable version.

**COPYING TAPES** **Reminder that tapes created by the FDR system cannot be copied with normal copy programs (such as IEBGENER). Use FDRTCOPY ([Section 10.10](#)) to copy FDR tapes.**

**ISAM** FDR V5.2 treats ISAM files as unmovable. If you have a need to restore ISAM files to a new device type or to restore them to a new location on the original device type, see member ISAM in the Installation Control Library (ICL) for instructions.

**UNLIKE DEVICE RESTORE** Most of the considerations for restoring or copying/moving ICF VSAM and non-VSAM data sets to unlike device types (such as 3380 to 3390) are documented in this manual. However, you should review member UNLIKE in the Installation Control Library (ICL) for special considerations.

**PRODUCT NEWS** **Member NEWS in the Installation Control Library (ICL) contains recent news and notes for all products in the FDR family. All users, new and old, should review this member.**

**SPECIAL CONSIDERATIONS FOR ALL FDR USERS**

**IMPORTANT TECHNICAL NOTE** Because of changes that IBM has made in the VVDS to support the 3390-9, a field in the VVDS called VVRXNTRK has changed its usage. Since FDR is sensitive to that field, changes in FDR are also required. If you install DFSMS/MVS 1.1.0 or MVS/DFP 3.3.2 or 3.2.1, which contain this change, even if you are not installing 3390-9 disks, you must also install FDR V5.2 level 09 or higher (preferably level 30 or higher). If you are sharing data between such a system and a system with an older level of DFP, V5.2 level 09 or higher must be installed on all sharing systems. If ICF VSAM clusters are backed up from such systems and are being restored on a system which has an older level of DFP (such as a disaster site), the new level of FDR is still required to properly restore the clusters.

**DISTRIBUTION TAPE FORMAT** The Distribution tape now contains IEBCOPY unloaded PDS's for all libraries, instead of the linkage editor and IEBUPDTE input that was previously used. The linkage editor is no longer used during the install since all modules are shipped with the proper attributes. There are fewer files on the tape. Any JCL that you used to install previous releases must be revised. If you have the ABR ISPF dialogs installed from a previous release, option A.I.1 cannot be used to install this tape. [See Sections 91 and 92](#) for updated installation instructions.

**HSM COMPATIBILITY AND COEXISTENCE** New functions are available which allow ABR to recall datasets for products which issue direct HSM requests for the recall of datasets which are cataloged to a volser of MIGRAT. These products include DB2 and NFSS, as well as many non-IBM software products. ABR now provides a front-end for the HSM SVC which will detect datasets ARCHIVED by ABR and invoke ABR to perform the recall. If HSM is also active on the system, ABR will coexist with HSM, passing datasets cataloged to volser MIGRAT to HSM if they were not archived by ABR. All extraneous HSM messages will be suppressed for ABR datasets.

The HSM compatibility functions are automatically activated when you dynamically install the ABR LOCATE exit. With this support, the ABR option MIGRAT=YES (to catalog ARCHIVED datasets to volser MIGRAT) can be used for all datasets. DB2 files will no longer be excluded from MIGRAT. [Section 52.24A](#) has more details.

**01.03 SUPPORTED HARDWARE AND SOFTWARE**

**OPERATING SYSTEMS** FAST DUMP RESTORE supports the following IBM Operating Systems:

...OS/VS1  
 ...MVS-SP  
 ...MVS/XA  
 ...MVS/ESA  
 ...MVS/ESA with DFSMS/MVS  
 ...VM (OS formatted disk packs only under an OS/VS system)

FDR, CPK and ABR may be executed on any of the above systems WITHOUT modifications.

**SUPPORTED DEVICES** The following direct-access devices are supported by FDR:

...2305 MODEL 1 and 2305 MODEL 2  
 ...2314/2319  
 ...3330 MODEL 1 and 3330 MODEL 11  
 ...3340 MODEL 35 and 3340 MODEL 70  
 ...3344  
 ...3350 in either NATIVE or 3330 MODE  
 ...3850 MASS STORAGE SUBSYSTEM  
 ...3375  
 ...3380  
 ...3380 and 3380-AE4 (DOUBLE DENSITY)  
 ...3380-K (TRIPLE DENSITY)  
 ...3390 MODELS 1 and 2 in NATIVE or 3380 COMPATIBILITY MODE  
 ...3390 MODEL 3 in NATIVE or 3380 COMPATIBILITY MODE  
 ...9340 MODEL 1 AND MODEL 2  
 ...3995 MODEL 151 OPTICAL DISK  
 ...3995 MODEL 153 OPTICAL DISK  
 ...3390 MODEL 9

The following tape devices are supported by FDR:

...2400/3420 AT 200-556-800BPI in 7 track mode  
 ...2400/3410/3420 AT 800-1600BPI in 9 track mode  
 ...3410/3422/3420/3430 at 6250 BPI in 9 track mode  
 ...3480/3490 Both in full function or compatibility mode with or without IDRC.  
 ...3490E cartridge support, including support for the double-length cartridge  
 ...3495 Automated Tape Library

The listed model numbers are IBM model numbers. Any plug-compatible device which conforms to IBM hardware and software conventions is also supported.

**MEMORY REQUIREMENTS** Most FDR functions can be performed within a region or partition size of 1000K. If, however, the user requests concurrent dump functions, the memory requirement will increase. Check the memory requirement for each program.

**TAPE VOLUME LABEL PROCESSING** FDR and CPK will process both labeled and non-labeled tapes. ABR requires the use of STANDARD LABEL TAPES for Dump and Archive processing. It is impossible for ABR to keep track of data sets residing on NON-LABELED TAPES!

# 01.04 CONTROL STATEMENT FORMAT

FAST DUMP RESTORE control statements consist of 80-character logical records. The general format of these records is:

<b>GENERAL FORMAT</b>	Where:	
	COLUMNS 1 to 71	– Contain the command, operands, and comments fields, except when continued to subsequent logical records.
	COLUMN 72	– Must be blank if the command or operands extend to column 71.
	COLUMNS 73 TO 80	– Not used by FDR. We suggest you use them as an identification or sequence field.



**COMMAND FIELD** The command field identifies the control statement and consists of a 1 or more character command word. It may appear anywhere within columns 1 to 71 and may be preceded only by zero (0) or more blanks. The command word must appear in its entirety within columns 1 to 71; it may not be continued.

**OPERAND FIELD** The operand field, if present, follows the command field and is separated from it by at least one blank. The operand field consists of one or more keyword and/or positional parameters, separated by commas. It may not contain embedded blanks except within quoted strings. Operand fields may be continued onto subsequent logical records. If operands are to be used with a command, at least one operand must be on the logical record containing the command.

**COMMENTS FIELD** The comments field, if present, follows the operand field(s) and is separated by one or more blanks. It may contain any information deemed helpful by the person who codes the control statement. Comments fields may not be continued, i.e., they must end at or before column 71. comments are not permitted on a control statement that allows operands but on which no operands have been specified.

**CODING AN OPERAND FIELD** An operand field consists of one or more parameters. These parameters are either positional or keyword parameters, and they are separated by commas. We now define positional and keyword parameters.

**POSITIONAL PARAMETERS** Positional parameters must be coded in a specific order relative to one another. This means that the variable data you substitute for positional parameter 1 must precede the variable data for positional parameter 2, and so on. The absence of variable data to be substituted for a positional parameter is indicated by coding a comma in its place. However, you may omit the commas when the absent parameter is the last one, or if all following positional parameters are absent.

**KEYWORD PARAMETERS** Keyword parameters are positional independent, and consist of either a keyword alone or a keyword followed by an equal sign (=) followed by user-specified variable information. When both positional and keyword parameters are to be coded in an operand, the keyword parameters must follow all positional parameters.

**SUB-PARAMETERS** Both positional and keyword parameters may consist of a list of subparameters. Such a list is composed of positional parameters that follow the usual rules for that type. A subparameter list must be enclosed within parentheses, unless the list reduces to a single subparameter, in which case the parentheses may be omitted.

CONTINUED . . .

**01.04 CONTINUED . . .**

**QUOTED STRINGS** When the variable data you specify for a parameter contains certain special characters, defined below, you must enclosed the data with apostrophes. This is called a 'quoted string'. Within a quoted string, all characters, including blanks, may appear; if an apostrophe is to be part of the string, it must be coded as two apostrophes.

**SPECIAL CHARACTERS:** Parentheses, commas, equal signs, apostrophes, and blanks.

**CONTINUING AN OPERAND FIELD** When the total length of an operand field exceeds the available columns in a logical record, it must be continued onto one or more following logical records.

To continue an operand, interrupt the operand field after a complete parameter or subparameter, including the following comma. Do this at or before column 71. leave the next column blank.

Continue the operand field starting anywhere between columns 1-71 of the following logical record.

Any number of logical record continuations may be present.

**EXAMPLE  
CONTINUED  
STATEMENT**

COLUMN

1

|  
|  
|  
|  
|

DUMP TYPE=ARC,  
RESERVE,PRINT=ALL,  
RETPD=120,  
ADAYS=30

EXAMPLE OF A  
CONTINUED OPERAND  
FIELD, WITH  
COMMENTS

COLUMN

72

|  
|  
|  
|  
|**COMMENT  
STATEMENT**

If you really have a lot to say, you may code comment statements, which are nothing but control statements with remarks contained within columns 2 to 71. Comment statements are identified by an asterisk (\*) in column 1. They may appear anywhere within a group of control statements, even between continued logical records.

**NOTATION**

The following notation is used in this manual to define control statement formats:

...Uppercase letters and words must be coded exactly as shown in a format description.

...Lowercase letters and words represent variables for which you must substitute specific information.

...Braces are never coded. They are used to indicate you must code one of the items within the braces.

For example: YES|NO

...Brackets are never coded. They indicate that the enclosed item is optional, and you can code one or none of the items.

For Example: **PRINT=ALL OR ADAYS=DDD  
ADATE=YYDDD**

...An ellipsis ... (3 consecutive periods) is never coded. It indicates that the preceding item can be coded more than once.

For example: DSN=(dsname,dsname...)

...An underscore \_ is never coded. It indicates that the underscored item is the default value.

For example: **DUMP=NO|YES**

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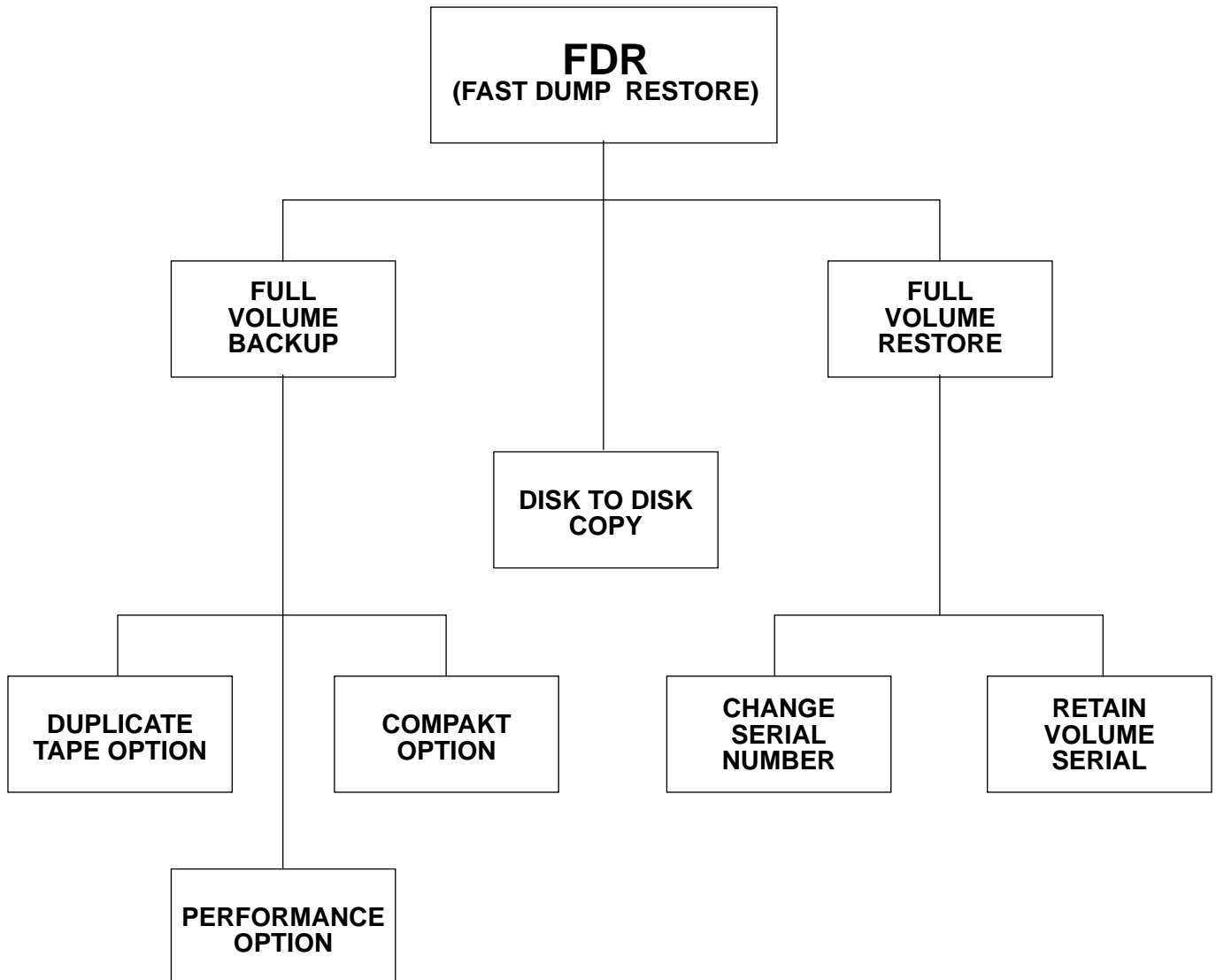


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**10.01 FDR OVERVIEW****FDR  
OVERVIEW**

The program FDR is the component of the FDR DASD MANAGEMENT SYSTEM that processes full volumes. FDR can be executed directly or as part of COMPAKTOR (CPK) or AUTOMATIC BACKUP & RECOVERY (ABR).

FDR performs full volume backups, restores or copies of DASD volume. An FDR backup creates a sequential file containing an image of an entire disk volume. The user has the option to restore the entire volume (using FDR, FDRABR or FDRCPK) or individual data sets or clusters (using FDRDSF or FDRABR) from an FDR created backup. In addition, if the operating system is not available, the backup and restore can be done using the Stand Alone Restore program (SAR).

**FDR  
FLOWCHART**

CONTINUED . . .

## 10.01 CONTINUED . . .

**FULL VOLUME BACKUPS**

FDR dumps from a DASD volume all tracks identified as allocated space by Format 1 or 3 DSCBs in the VTOC. The entire space allocated to the data sets will be dumped unless DATA=USED is specified. The VTOC, index and the label track (CYL 0, TRK 0) are also dumped. If errors are detected when processing the VTOC, a diagnostic message is provided. The entire pack, including the free space areas, will be dumped if an error in the VTOC is discovered. This procedure protects against the loss of data when there is possible invalid information in the VTOC. Data on assigned alternate tracks is logically incorporated into the DUMP.

FDR formats the VVR records from the 'SYS1.VVDS' data set onto the backup tape. This feature enables FDRDSF or FDRABR to restore ICF VSAM clusters by name.

[See Section 52.11](#) for further details.

**FULL VOLUME RESTORES**

FDR restores a logical image of a disk from an FDR formatted backup file. The DASD volume receiving the restore must be the same device type as the volume that was dumped. FDR uses the alternate assignments of the receiving disk pack when replacing data during the RESTORE. Therefore, a user can dump a volume which had no alternate tracks assigned and restore to another DASD volume which might contain alternates.

**DISK TO DISK COPYING**

FDR gives the user the capability of copying one disk volume to another disk volume of the same type. An FDR backup can also be created during the copy operation.

**DISK LABEL PROCESSING**

During DUMP, FDR copies the label of the disk volume to tape. All the information contained on the first track of the disk volume is always dumped. This includes the label record and IPL text if present.

During RESTORE, when the disk label is restored, the volume serial number (VOLID) of the disk pack to which the restore is made may optionally be retained. This option is controlled through the PARM field on the JCL EXEC statement or through the RESTORE command.

FDR always restores CYL 0 head 0 of a disk volume, which contains the IPL text. If a dump of a volume that did not contain IPL text is restored to a volume that did contain IPL text, the IPL text is lost. Care should be taken not to change the serial number of packs needed during IPL, since the system will not be able to find cataloged entries on this volume during NIP time.

If a volume containing VSAM files is restored to a new volume serial, the VSAM files will not be usable. ICF VSAM files can be restored to a new volume by [DSF](#) ([See Section 20](#)) or [ABR](#) ([Sections 50 and 51](#)).

**DIAGNOSTIC PROCESSING**

During DUMP/RESTORE FDR continually analyzes the processing and reports any discrepancy detected.

FDR detects and reports on both physical and logical I/O errors. Other conditions reported by FDR include non-standard record zeros, invalid record zeros, incorrect count fields, unreadable DSCBs in a VTOC, and misassigned alternate tracks.

The detection of a discrepancy on disk always results in a diagnostic message. Early termination of a DUMP/RESTORE depends upon the severity of the error. The action taken is reported in the diagnostic message. FDR is designed to recover from most disk errors with the loss of only the bad track or cylinder.

FDR indicates the successful completion of a DUMP/RESTORE with an FDR999 message.

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## 10.01 CONTINUED . . .

**ALTERNATE  
DEVICE  
SUPPORT**

3380 disk devices are available in single density, double density (3380-E) and triple density (3380-K) models. 3390 disks are available in single (3390-1) and double density (3390-2) models.

FDR provides a means to copy or restore backups of lower density devices to higher density devices.

COMPAKTOR can restore backups of higher density devices to lower density devices ([See Section 40](#)).

However, these full-volume restores and copies can be done only between models of the same device type (3380 or 3390).

FDR will restore to the first portion of a higher density unit from an FDR backup of a lower density unit. FDR then sets on the DOS bit in the VTOC. At the end of the restore, FDR will automatically allocate a temporary data set on the volume to force DADSM to recognize the remainder of the volume as free space.

NOTE: The temporary data set that FDR allocates has a name that starts with FDRABR.V. If your installation has a data security system, then the user running the restore job must be authorized to ALLOCATE this dsname.

If an indexed VTOC exists on these packs, the user must execute the ICKDSF program to rebuild the indexed VTOC of the volume after the restore.

Data sets can be placed on the remainder of the double density device from either FDR or DSF backup tapes using FDRDSF. CPK can also be used to restore a lower density device to a higher density device. CPK will automatically re-configure the free space and rebuild the indexed VTOC if it exists on the volume. Also, CPK provides the option to reposition the VTOC.

If the higher density device will not have the same serial number as the single density volume, and you want the data sets to be recataloged, then use FDRDSF or FDRABR to do the restore.

[See Section 52.14](#) for more information on moving data between different DASD devices.

**DOS PACKS**

Any DOS format disk pack that can be mounted through the OS/VS system can be dumped/restored with FDR or FDRDSF, even if the VTOC starts on cylinder zero, track zero.

**RELOCATING  
THE VTOC  
DURING  
RESTORE**

If, as a result of a RESTORE or COPY, the location of the VTOC or the volume serial number of the output pack is changed, FDR will re-establish the proper VTOC location and the volume serial number in the UCB automatically following the restore. FDR will also invoke the INDEXED VTOC SVC to update the VIB.

**WARNING: If a full pack restore is done on a shared DASD system, the user must first VARY the pack offline to all other systems. After the restore is completed, the MOUNT command can be issued.**

**CACHE  
SUPPORT**

FDR, if executed on a disk device which is connected to a caching control unit such as the 3990 model 3, will automatically avoid loading any new tracks into the cache for the volumes being dumped, restored, or copied. Tracks currently in the caching buffer belonging to other volumes will not be disturbed. Tracks in the cache that belong to the volumes being processed will be read from cache on a dump or for the input volume on a copy, and will be written to both cache and DASD on a restore and for the output volume on a copy.

**LINEAR  
DATA SETS**

FDR, DSF, CPK, and ABR have full support for dumping, restoring and archiving linear data sets, a new type of VSAM data set introduced in MVS/XA DFP 2.3.0.

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## 10.01 CONTINUED . . .

<b>DB2 SUPPORT</b>	FDR, DSF, CPK and ABR have full support for dumping, restoring, and archiving DB2 database files without special considerations. DB2 files are VSAM linear data sets or VSAM ESDS (nonindexed) clusters with a special internal format. These cannot be read by standard VSAM read functions, so some backup/restore software has required special programming to handle DB2. Since FDR handles all files on a physical track image level, the internal format of DB2 files is preserved, and they can be dumped, restored, allocated, and cataloged by FDR without any special considerations. The DB2 control files and internal pointers contain no physical location dependencies, so DB2 can be moved to different locations or different volumes by DSF or ABR without problems.
<b>OBJECT ACCESS METHOD</b>	OAM, the Object Access Method, is a new access method and storage technique introduced in DFP/MVS 3.2, for the storage of collections of data called "objects" (such as scanned images). OAM files may exist on DASD or on optical storage disks. OAM files on DASD are DB2 files, which are supported by FDR, DSF, CPK, and ABR. OAM files on optical disks do not look like traditional DASD, and are accessible only through OAM facilities. Since optical files are WORM (Write-Once, Read-Many) they are never updated; OAM provides for creating a one-time backup of optical files on other optical disks.
<b>DASD FAST WRITE</b>	The DASD Fast Write option, available on the 3990 model 3, provides no performance benefits when writing a large number of tracks in rapid succession, so it is not used by FDR, DSF, CPK, or ABR.
<b>IDRC</b>	There are no special considerations for the use of the Improved Data Recording Capability (IDRC) feature of the 3480/3490 cartridge drives. Backup tapes will be compacted by IDRC if requested by the proper JCL or system default options. FDR's compression option (COMPRESS=), since it reduces the amount of data going to the control unit, can still reduce dump elapsed time, at the cost of increased CPU time. When dumping to multiple drives on a string of 3480/3490s, the least elapsed time is obtained by using both IDRC and COMPRESS=.
	<b>WARNING: IDRC compacted tapes cannot be read on a 3480 drive without the IDRC feature.</b>
<b>DFSMS</b>	FDR, DSF and ABR supports backup and restore volumes that are under the control of System Managed Storage (SMS). <a href="#">See Section 52.50</a> for the special considerations in using FDR, DSF and ABR with SMS volumes.
<b>DUAL COPY</b>	Dual copy is supported on the 3990 model 3 controller and permits duplexing the writes going to specified volumes onto specified other volumes. FDR requires no changes to work with the dual copy feature. While the dual copy feature is useful for recovery due to data checks and head crash, backups are still required for recovery when data sets are incorrectly deleted, overlaid or corrupted by bad data.
<b>TAPE VTOC LISTING</b>	The PRINT TVTOC function, formerly available only to ABR customers, is now included with all FDR and FDR/CPK systems as well. This function, provided by the report utility program FDRABRP, can list information about all of the data sets on a FDR, DSF, or ABR backup data set (tape or disk); this can be useful when locating backups or pre-allocating data sets. This listing can be in IEHLIST LISTVTOC format or ABR VTOC format; for ICF VSAM clusters, a simulated IDCAMS LISTCAT report can also be produced. All data required to produce the report is in control records at the very beginning of the backup, so it takes only a few seconds. Details can be found in <a href="#">Sections 53.03</a> (FDRABRP JCL), <a href="#">53.10</a> (PRINT TVTOC command), and <a href="#">53.13</a> (Example). Other functions of FDRABRP are disabled for non-ABR customers.

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## 10.01 CONTINUED . . .

**VM  
VOLUMES**

FDR can dump and restore volumes belonging to VM system, both from OS systems running as guests under VM, and from independent OS systems which can access the disk drives in use by VM.

If the volume contains only VM formatted data (such as VM residence, spool, or paging volumes) or only CMS mini-disks, and was formatted by normal VM facilities, the volume will contain a dummy OS VTOC on CYL 0 TRK 0 so that it can be mounted on OS systems. FDR will recognize that dummy VTOC and automatically dump or restore all of the tracks on the device. Since there are no data sets in that VTOC, DSF can only do ABSOLUTE TRACK ADDRESS operations on such volumes.

Individual CMS formatted mini-disks may be restored from an FDR or DSF full-volume backup, but only to their original disk locations; DSF cannot be used to move CMS mini-disks.

**FDR V5.1, where BUFNO=MAX is the default, no longer requires that the alternate cylinders be included in the full-pack mini-disk definition. An exception is COPY TYPE=FDR (full-volume copy), which may get errors if the alternate cylinders are not included. An example for 3380-K is:**

```
MDISK cuu 3380 0 2656. . .
```

If the first mini-disk on the volume is in OS or DOS format and begins on real cylinder 0, then FDR will see the real VTOC on that mini-disk and dump only the allocated tracks on that mini-disk. There is no way to force FDR to dump the other mini-disks, but FDRDSF can be used to dump or restore all tracks on the physical volume using:

```
DUMP          TYPE=DSF
SELECT        FROM(CYL=0) , TO(CYL=cccc)
```

where "cccc" is the highest cylinder number on the volume (e.g. 2654 on a 3380-K).

If running as an OS guest under VM, then the real volume must be attached or dedicated to the OS guest, or it must be defined in the VM directory as a "full-pack" mini-disk (defined as starting on cylinder 0 with a size equal to the number of real cylinders on the disk).

If a volume is defined as a number of OS formatted mini-disks (such as a 3380-K defined as 3 3380 single density disks of 885 cylinders each), then each mini-disk may be separately defined to an OS guest. There are no special FDR considerations for processing these as separate disks.

Stand Alone Restore (SAR) has the ability to do backups and restores on any VM virtual machine without an operating system. It can process individual mini-disks (OS or CMS formatted) if they are defined to the virtual machine, and can be used to move a mini-disk to another of the same size (SAR absolute track operations are used for CMS mini-disks). [See Section 30](#) for details.

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**10.02 FDR PROCESSING OPTIONS, PERFORMANCE AND REQUIREMENTS****DISK DUMP  
OPTIONS**

FDR has three DUMP processing modes: DUMP one disk pack, DUMP up to thirty-nine disk packs serially, or DUMP up to thirty-nine disk packs to up to nine tape drives concurrently.

**A. SINGLE PACK MODE**

DUMP the single disk volume referred to by the DISKx DD statement to the tape referred to by the TAPEx DD statement.

**B. SERIAL MODE**

Sequentially DUMP all the disk volumes referred to by DISKx DD statements to the tapes referred to by the corresponding TAPEx DD statements.

**C. ATTACH MODE**

Concurrently DUMP the disk volumes referred to by the DISKx DD statements to the tapes referred to by the corresponding TAPEx DD statements. The value PARM=A must be specified on the EXEC card, or ATTACH must be specified on the DUMP command. Although there may be up to thirty-nine TAPEx DD statements (one for each DISKx), they must not specify more than nine unique tape units. The TAPEx DDs may use UNIT=AFF or VOL=REF. The number of unique units determines the number of concurrent DUMPs.

FDR will serialize the backup of any disk volumes which specify the same tape unit.

**DISK RE-  
STORE OP-  
TIONS**

FDR has two RESTORE processing options: RESTORE one or more disks giving the receiving PACK the volume serial number of the disk that was on the backup; or RESTORE one or more disks retaining the volume serial number of the receiving volume.

**A. RESTORE THE OLD VOLUME LABEL TO THE RECEIVING VOLUME**

To RESTORE changing the Volume Serial Number of the receiving disk to match the VOLID of the disk that is on the backup tape, use the value PARM=R on the EXEC card, or specify CPYVOLID=YES on the RESTORE command.

**B. RESTORE RETAINING THE VOLUME LABEL OF THE RECEIVING VOLUME**

To RESTORE retaining the Volume Serial Number of the receiving disk, use the value PARM=N on the EXEC card, or specify CPYVOLID=NO on the RESTORE command or use a RESTORE command with the CPYVOLID operand omitted.

**COPY OPTION**

FDR can copy from one to thirty-nine disk volumes to new disk volumes. FDR will copy the volume specified by the DISKx DD statement to the disk volume specified by the matching TAPEx DD statement. As with a FDR RESTORE the label of the volume being copied to may be retained or changed. The duplicate TAPExx DD statement is supported and will result in a backup being taken of the volume in addition to the copy.

**CHANNEL  
REQUIRE-  
MENTS**

When possible the disk and tape units used by FDR for DUMP/RESTORE processing should be on separate channels. This can make a noticeable difference in throughput performance. Internal monitors allow FDR to utilize the tape channel at full capacity. Time dependent tape processing, e.g., online log tapes, should not be put on the same tape channels utilized by FDR.

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## 10.02 CONTINUED . . .

**FDR DUMP/  
RESTORE  
PERFOR-  
MANCE**

The performance of most DUMP/RESTORE utilities is sharply impacted by the environment in which they are run. FDR, with internal dynamic monitors overlapping tape and disk management, is not subject to this sharp degradation. FDR performance will remain relatively consistent in an environment of varying work loads.

Backup of critical information is usually dictated by two factors: the application recovery plan and the actual time required to take the backups which is too often the overriding factor.

Using FDR the needs of a recovery plan can take priority. The superior performance of FDR, particularly in a heavily loaded multiprogramming environment, makes frequent backups practical. The system resources dedicated to DUMP/RESTORE can be decreased and still allow frequent backup of system data.

Under normal processing circumstances with a volume 80% full (allocated space), FDR will back up to tape in the following manner:

DEVICE TYPE	**** TAPE REELS ****		3480 with IDRC or
	6250 BPI	3480	FDR COMPRESS=
3380	4	3	2
3380-E	7	5	3
3380-K	10	8	4
3390-1	5	4	2
3390-2	10	8	4

Tape usage will be cut in half with the use of IDRC or FDR's COMPRESS= feature.

**MEMORY  
REQUIRE-  
MENTS**

FDR will execute in either virtual or real memory.

Following are the guidelines for calculating the approximate memory requirements for backups. In all cases, these guidelines should give results that are somewhat higher than the amount actually needed.

PROGRAM STORAGE: 100K

For FDRABR, and FDR or FDRDSF with the ATTACH option, add the following to the program storage for each TAPEX DD statement. For FDR or FDRDSF without the ATTACH option, add this requirement once:

Without COMPRESS= 1024K

With COMPRESS= 2048K

Duplicate tapes (TAPEXX) do not require any additional memory.

TAPE DRIVES	COMPRESS	STORAGE
1	no	1124K
1	yes	2148K
2	no	2148K
2	yes	4196K
3	no	3172K
3	yes	6244K
EXAMPLES OF STORAGE FOR DUMP TYPE=FDR		

CONTINUED . . .

**10.02 CONTINUED . . .****PERFORMANCE  
OPTION**

As a default, during a dump operation, FDR will acquire enough buffers to retain a cylinder of data in storage at a time (BUFNO=MAX), and will use an I/O technique involving the Read Multiple Count Key Data command or the Read Track command. This technique requires 1024K per concurrent backup without COMPRESS, or 2048K per concurrent backup with COMPRESS. The virtual storage for these buffers is located in the private area below 16 MB, and the real storage is located above 16 MB, if available. INNOVATION strongly recommends running with this technique for optimum performance. However, if the installation does not have sufficient storage to support this technique, it is possible to request a smaller number of buffers. In that case a slower I/O technique will be used. A smaller number of buffers may be requested by changing the installation default ([See Section 91 or 92](#)), or at execution time by specifying BUFNO=nn. The storage requirement is about 58K per buffer for 3390 and about 50K per buffer for other devices.

**DUPLICATE  
TAPE OPTION**

FDR has an option to create a duplicate or second copy of the backup tape during dump processing. When several packs are dumped duplicate backup files may be made for one or more of the disks regardless of the others.

To create a duplicate backup file during the DUMP a TAPEX, TAPEXX set of DD statements are used in conjunction with the TAPEX DD statement.

If a duplicate backup file is specified on a COPY operation, FDR will create a true backup copy of the volume being copied.

Memory requirements do not increase with the use of the duplicate tape option.

**COMPAKTOR  
OPTION**

FDR has the option to execute FDRCPK to COMPAKT the volume after a successful dump.

FDR will execute a CPK DUMP=YES internally. User must specify additional DD statements for COMPAKTOR. A SYSPRINx, SYSMAPx must be present for CPK. Optionally a CPK SYSIN Control statement file (CPINx) may be present, specifying CPK override statements.

Conditional COMPAKTion; FDR can be instructed to COMPAKT only if an unacceptable amount of fragmentation exists on the volume.

NOTE: COMPAKTOR is a cost option to FDR, which must be licensed for this option to be available.

**DATA SET  
ENQUEUE  
OPTION**

The user can request that FDR test the availability of the data sets on the volume(s) being dumped. A data set is considered active if any job in the system, other than FDR, has a DD statement referencing it. This is true whether the disposition specifies OLD, SHR or NEW. Any data set which is active will have a warning message issued, but will still be dumped. If COMPAKT is specified, these data sets will be marked as unmovable by COMPAKTOR. In addition the user can request that the data set be enqueued during the execution of the DUMP and COMPAKTion (if COMPAKT is specified).

**COMPRESS  
OPTION**

FDR can be instructed to compress the data on the sequential backup file. This option will decrease the number of bytes transferred to the backup file. The compressed file will usually be 20 to 50% smaller than an uncompressed file. However, the CPU time used by FDR to dump the disk will increase substantially.

NOTE: FDR, including SAR, will automatically recognize a compressed backup file during a restore operation.

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### 10.03 JOB CONTROL REQUIREMENTS

To execute FDR, the following JCL statements are required.

**JOB  
STATEMENT**

The JOB Statement is user-specified and depends on user standards.

**STEPLIB or  
JOBLIB DD  
STATEMENT**

If required, specifies the job library on which FDR resides. The library must be authorized.

**EXEC  
STATEMENT**

Specifies the program name (FDR), region requirement, and PARM field. The PARM options are:

1. no PARM — FDR will process as specified by the DUMP, RESTORE or COPY command in the SYSIN data set. If there is no PARM field and no SYSIN data set, FDR will dump all disks for which a pair of DISKx, TAPEx DD statements appear. Dumping will occur sequentially, in DISK DD statement order.
2. PARM=D — FDR will dump all disks for which a pair of DISKx, TAPEx DD statements appear. Dumping will occur sequentially, in DISK DD statement order.
3. PARM=A — FDR will dump concurrently all disks for which a triplet of DISKx, TAPEx, SYSPRINx DD statements appear. This is the ATTACH option. FDR will serialize dumps to TAPEx DD cards that specify the same drive. A maximum of nine unique tape drives may be specified.
4. PARM=R — FDR will restore to all DISKx and TAPEx pairs, copying the VOLID from the backup.
5. PARM=N — FDR will restore to all DISKx and TAPEx pairs, retaining the VOLID of the pack being restored to.

NOTE: Full volume restores are always run serially. Submit a separate job for each volume you want to restore concurrently.

The PARM field may also contain an FDR DUMP, RESTORE, or COPY statement, for example,

PARM=' DUMP TYPE=FDR, COMPRESS=ALL'

It will be processed as if read from SYSIN; no SYSIN DD is required.

**SYSPRINT DD  
STATEMENT**

Specifies the output message data set. Usually a SYSOUT data set. If not SYSOUT, this DD must specify a disposition of MOD. Must be present for all dumps or restores.

**SYSUDUMP DD  
STATEMENT**

Specifies the abend data set. Usually a SYSOUT data set. A SYSUDUMP DD statement should always be included to assist in error diagnosis.

**DISKx DD  
STATEMENT**

For DUMP or COPY, specifies the unit, volume serial and disposition of the input disk volume.

On RESTORE, specifies the disk volume being restored to. x may specify any valid alphanumeric character (0-9, A-Z) and must have a corresponding TAPEx statement. Processing will proceed for as many pairs of DISKx/TAPEx statements as are present. If DUMMY is specified, this DD statement will be ignored.

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## 10.03 CONTINUED . . .

- TAPE<sub>x</sub> DD STATEMENT** On DUMP Operations -- Specifies a backup tape or sequential disk data set. DUMMY is supported. When TAPE<sub>x</sub> references a disk data set, a sequential backup is created in the data set pointed to by this DD statement. UNIT=AFF or VOL=REF may be specified, referencing another TAPE<sub>x</sub> DD statement. This dump will be serialized by FDR, running after the previous tape dump has completed.
- You should specify a volume count on the TAPE DD statement since the system default is 5.
- A full 3380-K could require up to 12 3420 reels at 6250 BPI, or 9 3480 cartridges. Even with COMPRESS reducing the volume of tape by 50%, the backup can exceed 5 volumes. If a DD statement does not specify a volume count, and the dataset exceeds 5 volumes, the Operating System gives an S837 ABEND.
- On RESTORE Operations — Specifies the backup dataset on tape or disk. If the dump required multiple tape or disk volumes, those volumes must be specified in the correct order during the RESTORE.
- On COPY Operations — Specifies the output disk volume. FDR will create an image copy of the volume specified by the DISK<sub>x</sub> DD statement on this volume. DISK<sub>x</sub> and TAPE<sub>x</sub> must not specify the same volume.
- There must be a TAPE<sub>x</sub> statement matching every DISK<sub>x</sub> statement.
- TAPE<sub>xx</sub> DD STATEMENT** Specifies a second tape (for DUMP or COPY only). A duplicate backup file for TAPE<sub>x</sub> will be produced on TAPE<sub>xx</sub>. For example, if DISK6 is being dumped to TAPE6, the inclusion of a TAPE66 DD statement will cause a second backup file to be produced.
- On COPY operations, this is a sequential backup of the DISK<sub>x</sub> volume.
- SYSPRIN<sub>x</sub> DD STATEMENT** Specifies the output data set for messages related to the matching DISK<sub>x</sub> when the ATTACH, COMPAKT or COPY option is used. Must be present if PARM=A or ATTACH, COMPAKT is used or if COPY is specified, not needed otherwise. Usually a SYSOUT data set. If not SYSOUT, this DD must specify a disposition of MOD.
- SYSMAP<sub>x</sub> DD STATEMENT** Specifies the output data set for the COMPAKTOR map. Must be present if COMPAKT is specified on an FDR dump. x must match each DISK<sub>x</sub> DD statement. Usually a SYSOUT DD statement.
- CPIN or CPIN<sub>x</sub> DD STATEMENT** Optional if COMPAKT is specified. CPIN<sub>x</sub> specifies the CPK control statements to be used when compacting the volume which matches the x specified on the DISK<sub>x</sub> DD statement. If CPIN is specified without a qualifier x, these control statements will apply to all DISK<sub>x</sub> DD statements which do not have a matching CPIN<sub>x</sub>. All of the CPK control statements are valid except for DUMP=YES, FROMDD=, VTOC=COMPAKT and ENQ=.
- Default if CPIN<sub>x</sub> is not specified:
- CPK DUMP=YES, FROMDD=TAPE<sub>x</sub>, ENQ=RESERVE, VTOC=NOCHANGE
- NOTE: If ENQ is to be overridden, it must be done in the FDR control statements.
- If CPIN<sub>x</sub> is specified but it does not include a COMPAKT command, then the default is SIMULATE. CPIN may contain a MAP statement if you want only a MAP of the volume dumped.
- CPKWORK DD STATEMENT** Required if COMPAKT is specified and an active INDEXED VTOC exists on the volume being compacted. Usually specifies a temporary disk data set. One cylinder of primary with one cylinder of secondary should be specified. This data set must not be allocated on the volume being compacted.
- IXSYSPRT DD STATEMENT** Required if COMPAKT is specified on a non-MVS system with an active indexed VTOC on the volume being COMPAKted. Under MVS, CPK will dynamically allocate this DD statement to DD DUMMY unless it is specified. Usually a SYSOUT data set.
- SYSIN DD STATEMENT** Optional control statement data set. Usually an input stream or DD \* data set. For backward compatibility, if SYSIN is allocated with a disposition of NEW, FDR will ignore this data set.

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**10.04 The FDR DUMP Command**

**DUMP**  
**D**

**TYPE=FDR**

**,ATTACH**

**,BUFNO = MAX | nn**

**,COMPAKT**

**,CPKFREEEX =nnnnnn**

**,CPKDSNMX=nnnnnn**

**,CPKMULTX=nnnnnn**

**,COMPRESS = ALL | COPY1 | COPY2**

**,DATA = ALL | USED**

**,DSNENQ = NONE | TEST | USE | HAVE**

**,ENQ = ON | OFF | RESERVE**

**,FORMAT = OLD | NEW | SPLIT**

**,MAXERR=nnnn**

**,LBPZERO=VALID | INVALID**

**,ENQERR=NO**

**,TAPERRCD=NO**

**DUMP COMMAND** This control statement is optional. Only one DUMP Statement is allowed per execution.

<b>OPERANDS</b>	<b>TYPE=FDR</b>	Specifies the type of dump. Must be specified on the DUMP Statement. Indicates that a full volume dump is to be performed.
	<b>ATTACH</b>	Specifies that FDR is to dump the disk packs concurrently. This is the same function as specified by using PARM=A.

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## 10.04 CONTINUED . . .

<b>BUFNO=</b>	<p>Specifies the FDR performance option.</p> <p><b>MAX</b> — specifies that FDR is to acquire enough buffers to retain a cylinder of data in storage at a time, and is to use an I/O technique involving the Read Multiple Count Key Data command or the Read Track command. This technique requires 1024K per concurrent backup without COMPRESS, or 2048K per concurrent backup with COMPRESS. The virtual storage for these buffers is located in the private area below 16 MB, and the real storage is located above 16 MB, if available. INNOVATION strongly recommends running with this technique for optimum performance.</p> <p><b>nn</b> — specifies the actual number of buffers to be acquired. This option may be requested if the installation does not have sufficient storage to support BUFNO=MAX. This option causes FDR to use a slower I/O technique than with BUFNO=MAX. nn should be an even number from 2 to the number of buffers needed to contain one cylinder (which is 16 for 3390, 3380, and 3350). If nn is an odd number, FDR will round down. If nn is higher than the number of buffers needed to contain one cylinder of the device being dumped, it will be treated the same as MAX. The storage requirement is about 58K per buffer for 3390 and about 50K per buffer for other devices.</p> <p>This option is ignored if backup is to disk.</p> <p>Default is BUFNO=MAX.</p> <p>INNOVATION strongly recommends running with BUFNO=MAX for optimum performance.</p>
<b>COMPAKT</b>	<p>Specifies that FDR is to execute FDRCPK internally to COMPAKT the volume after a successful dump. A matching SYSPRINx and SYSMAPx DD statement must be present. User may provide CPK control statements using a CPINx DD statement.</p>
<b>CPKFREEX=</b> <b>CPKDSNMX=</b> <b>CPKMULTX=</b>	<p>Can only be specified with COMPAKT. These operands define an amount of fragmentation that the user considers acceptable. If none of these operands are specified, COMPAKTOR will be invoked unconditionally. If one or more of these operands are specified and none of the limits that they request are exceeded by a given volume, COMPAKTOR will not be invoked for that volume.</p> <p><b>CPKFREEX</b> — specifies the maximum number of free space areas that can exist before COMPAKTOR will be invoked.</p> <p><b>CPKDSNMX</b> — specifies the maximum number of data sets that can have more than one extent before COMPAKTOR will be invoked.</p> <p><b>CPKMULTX</b> — specifies the maximum number of extents that are not the first extent of a data set that can exist before COMPAKTOR will be invoked.</p> <p>Example: DUMP TYPE=FDR,COMPAKT,CPKFREEX=10, CPKDSNMX=5</p>
<b>COMPRESS=</b>	<p>If the volume does not exceed 10 free space areas or 5 multi-extent data sets, it will not be COMPAKTed. If it exceeds either limit, it will be COMPAKTed.</p> <p><b>ALL</b> — specifies that FDR is to compress the output data on the backup file for both copies (TAPEx and TAPExx).</p> <p><b>COPY1</b> — specifies that only the data on the TAPEx DD statement will be compressed.</p> <p><b>COPY2</b> — specifies that only the data on the TAPExx DD statement will be compressed.</p> <p>Add 1024K to the memory requirement per each concurrent subtask.</p> <p>Default is NONE.</p> <p>INNOVATION strongly recommends running with COMPRESS to substantially reduce tape usage and to reduce elapsed time, if CPU time and storage are available.</p>

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## 10.04 CONTINUED . . .

**DATA=**

**USED** — specifies that FDR is to dump only the used portion of PS or PO type data sets. On most packs, this will make the dump run faster, but at the risk of not backing up all of the data if data sets have invalid last block pointers.

If the data set has a last block pointer of all zeroes, which usually means it was never used, FDR will default to dumping the entire data set unless LBPZERO=VALID is specified. With LBPZERO=VALID, FDR will dump only the first track.

**ALL** — specifies that FDR is to dump the entire allocation of all datasets.

Default is ALL.

**DSNENQ=**

Specifies that FDR is to enqueue all of the data sets on the volume being dumped. FDR will issue an exclusive enqueue with a major name of 'SYSDSN' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, FDR will issue a warning message for the data set. The data set will still be dumped. If the COMPAKT option is used or FDR is being executed by COMPAKTOR, the data set will be treated as unmovable by COMPAKTOR. A U0888 will be issued at the end of the FDR execution unless COMPAKTion is being done or ENQERR=NO is specified. DSNENQ is independent of ENQ= which prevents new data sets from being allocated or old data sets from being scratched.

**TEST** — The data sets will only be tested to see if they are active at the time the dump starts. The data set will not be enqueued.

**USE** — The data sets will be enqueued for the duration of the dump and COMPAKTion (if COMPAKT). If not available, only a warning message is issued and the data set will not be enqueued.

**HAVE** — The data sets will be enqueued for the duration of the dump and COMPAKTion (if COMPAKT). If not available, FDR will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. If WAIT is specified, FDR will wait for the data set to become available. The job could time out. If NOWAIT is specified, FDR will print a warning message for the data set and will not issue the enqueue. If RETRY is specified, FDR will attempt the enqueue again.

**NONE** — This is the default. No data set ENQ will be issued.

**NOTE:** If the data set is specified in a DD statement in the FDR job with a DISP=SHR, FDR will change the scheduler enqueue for the data set to EXCLUSIVE (DISP=OLD) if the user specifies TEST, USE or HAVE. The operator cannot respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.

**CAUTION:** This option should not be used on shared DASD unless a cross-system enqueue facility is available and the SYSDSN QNAME is broadcast across systems. Without this capability, FDR can only determine what data sets are active on the system FDR is running on.

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## 10.04 CONTINUED . . .

<b>ENQ=</b>	<p><b>ON</b> — specifies that FDR is to perform an enqueue on the VTOC during the dump operation. This enqueue will lock out users from allocating new data sets or scratching and extending old data sets on the system FDR is running on.</p> <p><b>RESERVE</b> — specifies that FDR will issue a RESERVE on the volume being dumped. This command will lock out a shared DASD system from accessing the pack.</p> <p><b>OFF</b> specifies that FDR will not enqueue the VTOC during the dump or COMPAKTion (if COMPAKT).</p> <p>Default is OFF — NO enqueue unless COMPAKT is specified, then RESERVE is the default. The ENQ will be maintained from the beginning of the dump until the end of COMPAKTion.</p>
<b>FORMAT=</b>	<p>Specifies the format of the sequential backup file.</p> <p><b>OLD</b> — specifies that FDR is to create the backup using the format prior to Ver 4.5. This option defaults to SPLIT on 3380 and 3390 disk.</p> <p><b>NEW</b> — specifies that FDR is to create the backup using a maximum of a 56K blocksize.</p> <p><b>SPLIT</b> — specifies that FDR is to create the backup using a maximum blocksize of 32K. FDR will split the backup blocks into multiple records.</p> <p>WARNING: If you use a normal copy program (ex: IEBGENER) to copy a backup file created with FORMAT=NEW, you will not get any error messages, but the resulting tape will not be usable for a restore. Tapes in the new format must only be copied with the INNOVATION provided tape copy program (FDRTCOPY) or FATAR. If FORMAT=OLD or SPLIT is specified, FDR will ignore the BUFNO=MAX option.</p> <p>Default: NEW if backup on tape — SPLIT if backup is on disk.</p> <p>Use of FORMAT=OLD or SPLIT will result in a large increase in elapsed time.</p>
<b>MAXERR=</b>	<p>Specifies the number of tape or disk errors that are permitted by FDR prior to abending the DUMP operation. MAXERR may specify a value from 1 to 9999 errors. Each error will be indicated by a message and possible MINI DUMP.</p> <p>WARNING: MAXERR over the default value may result in the loss of many data sets. This option should only be used when necessary and with care.</p> <p>Default is 20 errors.</p>
<b>LBPZERO=</b>	<p><b>VALID</b> — specifies that FDR is to consider PS or PO data sets which are empty (last block pointer of zero) as containing one used track.</p> <p><b>INVALID</b> — specifies that FDR will consider PS or PO data sets which are empty as fully used.</p> <p>WARNING: Care should be taken using this option since certain data sets may have the last block pointer as all zeroes and still not be empty.</p> <p>Ex: SYS1.DUMP data sets.</p> <p>Default is INVALID — unless overridden in the FDR/ABR global option table (See Section 91 or 92).</p>
<b>ENQERR=</b>	<p><b>NO</b> — specifies that FDR will not set a condition code or ABEND at the end of the FDR execution if the DSNENQ option is used and a data set is found to be active.</p> <p>Default is that FDR will issue the condition code or ABEND unless COMPAKT is specified.</p>
<b>TAPERRCD=</b>	<p><b>NO</b> — specifies that FDR is not to set a condition code or ABEND if a data check or other error occurred writing the backup file but FDR recovered from it.</p> <p>Default is that FDR will set the condition code or ABEND at the end of the job.</p>

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## 10.05 The FDR RESTORE Command

```

RESTORE
R                TYPE=FDR
                   ,CONFMESS = YES / NO
                   ,CPYVOLID = NO / YES
                   ,ENQ = OFF / RESERVE
                   ,MAXERR=nnnnn
                   ,PROT=none
                   ,SMSPROT = ALL / NONE
                   ,VOLRESET = NO / YES

```

**RESTORE STATEMENT** This control statement is optional. Only one RESTORE statement is allowed per execution. Compressed backup files will automatically be recognized by FDR, requiring no special keywords.

**OPERANDS** **TYPE=FDR** Specifies the type of RESTORE. Must be specified on the RESTORE statement. Indicates that a full volume restore is to be performed.

**CONFMESS=** **YES** — specified that, before beginning the restore, FDR will request confirmation via a WTOR message to which the operator must reply.  
**NO** — suppresses the WTOR and begins the restore immediately.  
 Default is YES.  
 NOTE: This feature can be very useful at a disaster recovery site to avoid full volume restores being delayed waiting for an operator response.

**CPYVOLID=** Specifies whether FDR is to restore the volume serial number from the backup file.  
**YES** — specifies that FDR will replace the volume serial number of the volume being restored to with the original volume serial number of the disk which was dumped. This option can also be specified by PARM=R on the JCL EXEC statement. If another online volume has the same serial, FDR will set the restored volume offline at the end of the restore.  
**NO** — specifies that FDR will retain the volume serial number of the receiving volume. This option can also be specified by PARM=N on the JCL EXEC statement.  
 Default is NO — unless the volume being restored was SMS-managed, when YES is forced.

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## 10.05 CONTINUED . . .

<b>ENQ=</b>	<p><b>OFF</b> — specifies that FDR is not to perform a RESERVE on the disk volume prior to the restore.</p> <p><b>RESERVE</b> — specifies that FDR will issue a RESERVE of the VTOC for the duration of the restore. This RESERVE will not prevent users from opening existing data sets.</p> <p>Default is to do a RESERVE of the volume.</p>
<b>MAXERR=</b>	<p>Specifies the number of tape or disk errors that are permitted by FDR prior to abending the RESTORE operation. MAXERR may specify a value from 1 to 9999. Each error will be indicated by a message and possible MINI DUMP.</p> <p>Default is 20 errors.</p>
<b>PROT=</b>	<p><b>NONE</b> — normally FDR can only restore to volumes of the same type as the dumped disk, with the same or larger capacity (number of cylinders), e.g., 3390-2 to 3390-2 or 3390-3. PROT=NONE allows FDR to restore to a smaller disk of the same type, e.g., 3390-3 to 3390-2. Do not specify PROT=NONE unless you need this function since it also suppresses other validity checks.</p> <p>WARNING: Restore to a smaller disk will fail if the larger disk had data set allocated beyond the end of the smaller disk. Use COMPAKTOR (See Section 40) to convert such disks.</p>
<b>SMSPROT=</b>	<p><b>ALL</b> — enforces several rules when SMS-managed volumes are involved: Backups of SMS-managed volumes can only be restored to SMS-managed volumes, and non-SMS volumes only to non-SMS volumes. CPYVOLID=YES is forced when an SMS-managed volume is restored.</p> <p><b>NONE</b> — allows the restore of SMS-managed volumes to non-SMS volumes, and vice versa. Also allows the restore of SMS volumes to new volumes if CPYVOLID=NO is specified. This option should be used with caution.</p> <p>Default is ALL. SMSPROT=NONE should be used with caution.</p>
<b>VOLRESET=</b>	<p><b>YES</b> — specifies that at the end of a restore operation FDR will rename the SYS1.VTOCIX data set and the ABR model DSCB to match the new volume serial number, if the volume serial number specified within the data set name matches the volume serial of the pack that was backed up. Also the volume serial field in the Format 1 DSCB for every data set on the volume will be reset if it matches the original volume serial. This option has no effect if CPYVOLID=YES (PARM=R) is specified.</p> <p><b>NO</b> — will inhibit this operation. This is useful if the volume will eventually be relabeled back to the original volume serial.</p> <p>NOTE: If an ABR initialized volume is restored, FDR will reset the ABR model DSCB to force a full volume dump on the next execution of ABR, unless NO is specified.</p> <p>VSAM WARNING: If the serial number is changed on a volume which contains VSAM files, the VSAM files will be inaccessible. Also, FDR will not reset the VOLSER in the VVDS, since the VVDS and the catalogs contain self-defining records which would also need resetting.</p> <p>Default is YES.</p>

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## 10.06 The FDR COPY Command

**COPY**            **TYPE=FDR**

**,BUFNO = MAX / nn**

**,CONFMESS = YES / NO**

**,CPYVOLID = NO / YES**

**,DATA = ALL / USED**

**,DSNENQ = NONE / TEST / USE / HAVE,**

**ENQ = ON / OFF / RESERVE**

**,MAXERR=nnnnnn**

**,PROT=none**

**,SMSPROT = ALL / NONE**

**,VOLRESET = NO / YES**

**COPY COMMAND** Only one COPY statement is allowed per execution. The PARM option in the EXEC statement must not be specified with the COPY statement. Specifies that the disk volume specified by the DISKx DD statement is to be copied to the disk volume specified by the matching TAPEx DD statement. If a TAPExx DD statement is also specified, FDR will also create a backup of DISKx.

NOTE: A SYSPRINx DD statement is required matching the DISKx DD statement. This print data set will record the messages from the dump of the DISKx volume. The SYSPRINT data set will record the messages from the restore to the TAPEx volume.

The FDRCOPY command can copy from a smaller density DASD to a larger capacity of the same type. (i.e. 3380-E to 3380-K or 3390-2 to 3390-3) If you want to copy from a larger DASD (3380-K) to a smaller device (3380-E) it is usually more convenient to use COMPAKTOR. If you prefer to use COPY TYPE=FDR and no data sets are allocated on tracks beyond the end of the smaller disk, specify PROT=none.

<b>OPERANDS</b>	<b>TYPE=FDR</b>	Indicates that the entire volume is to be copied. Must be specified.
	<b>BUFNO=</b>	Specifies the FDR performance option.  <b>MAX</b> — is the default and specifies that FDR is to acquire enough buffers to retain a cylinder of data in storage at a time. It can be overridden but the alternate performance option is much slower and is not recommended.
	<b>CONFMESS=</b>	<b>YES</b> — specifies that, before beginning the copy, FDR will request confirmation via a WTOR message to which the operator must reply. <b>NO</b> — suppressed the WTOR and begins the copy immediately. Default is YES.
	<b>CPYVOLID=</b>	Specifies whether FDR is to COPY the volume serial number from the DISKx volume.  <b>YES</b> — specifies that FDR will replace the volume serial number of the volume being COPIED to with the original volume serial number of the DISKx volume. The output volume will be set offline at the end of the copy. <b>NO</b> — specifies that FDR is to retain the receiving volume's volume serial number. Default is NO unless the volume being copied is SMS-managed when YES is forced.

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## 10.06 CONTINUED . . .

<b>DATA=</b>	<p><b>USED</b> — specifies that FDR is to copy only the used portion of PS or PO type data sets. On most packs, this will make the copy run faster, but at the risk of not copying all of the data if data sets have invalid last block pointers.</p> <p>If the data set has a last block pointer of all zeroes, which usually means it was never used, FDR will default to copying the entire data set unless LBPZERO=VALID is specified. With LBPZERO=VALID, FDR will copy only the first track.</p> <p><b>ALL</b> — specifies that FDR is to copy the entire allocated data set for all datasets.</p> <p>Default is ALL.</p>
<b>DSNENQ=</b>	<p>Specifies that FDR is to enqueue all of the data sets on the volume being copied. FDR will issue an exclusive enqueue with a major name of 'SYSDSN' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, FDR will issue a warning message for the data set. The data set will still be copied. A U0888 will be issued at the end of the FDR execution unless ENQERR=NO is specified. DSNENQ is independent of ENQ= which prevents new data sets from being allocated or old data sets from being scratched.</p> <p><b>TEST</b> — The data sets will only be tested to see if they are active at the time the copy starts. The data sets will not be enqueued.</p> <p><b>USE</b> — The data sets will be enqueued for the duration of the copy. If not available, only a warning message is issued and the data set will not be enqueued.</p> <p><b>HAVE</b> — The data sets will be enqueued for the duration of the copy. If not available, FDR will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. If WAIT is specified, FDR will wait for the data set to become available. The job could time out. If NOWAIT is specified, FDR will print a warning message for the data set and will not issue the enqueue. If RETRY is specified, FDR will attempt the enqueue again.</p> <p><b>NONE</b> — No data set ENQ will be issued.</p> <p>Default is NONE — no data set enqueue will be issued.</p> <p>NOTE: If the data set is specified in a DD statement in the FDR job with DISP=SHR, FDR will change the scheduler enqueue for the data set to EXCLUSIVE (DISP=OLD) if the user specifies TEST, USE or HAVE. The operator cannot respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.</p> <p>CAUTION: This option should not be used on shared DASD unless a cross-system enqueue is available and SYSDSN QNAME is broadcast across systems. Without this capability, FDR can only determine which data sets are active on the system FDR is running on.</p>
<b>ENQ=</b>	<p><b>ON=</b> — specifies that FDR is to perform an enqueue on the VTOC on the DISKx volume during the COPY operation. This enqueue will lock out users from allocating new data sets or scratching old data sets.</p> <p><b>OFF</b> — specifies that FDR will not enqueue the DISKx or TAPEx volumes.</p> <p><b>RESERVE</b> — specifies that FDR is to perform a RESERVE on the DISKx volume and the TAPEx volume.</p> <p>Default is NO enqueue on the DISKx volume and a RESERVE on the TAPEx volume.</p>

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## 10.06 CONTINUED . . .

- MAXERR=** Specifies the number of tape or disk errors that are permitted by FDR prior to abending the COPY operation. MAXERR may specify a value from 1 to 9999. Each error will be indicated by a message and possible MINI DUMP.
- WARNING: MAXERR over the default value may result in the loss of many data sets. This option should only be used when necessary and with care.
- Default is 20 errors.
- PROT=** **NONE** — normally FDR can only copy to volumes of the same type as the input disk, with the same or larger capacity (number of cylinders), e.g., 3390-2 to 3390-2 or 3390-3. PROT=NONE allows FDR to copy to a smaller disk of the same type, e.g., 3390-3 to 3390-2. Do not specify PROT=NONE unless you need this function since it also suppresses other validity checks.
- WARNING: Copy to a smaller disk will fail if the larger disk had data set allocated beyond the end of the smaller disk. Use COMPAKTOR (See Section 40) to convert such disks.
- SMSPROT=** **ALL** — enforces several rules when SMS-managed volumes are involved: SMS-managed volumes can only be copied to SMS-managed volumes, and non-SMS volumes only to non-SMS volumes. CPYVOLID=YES is forced when an SMS-managed volume is copied.
- NONE** — allows the copy of SMS-managed volumes to non-SMS volumes, and vice versa. Also allows the copy of SMS volumes to new volumes if CPYVOLID=NO is specified. This option should be used with caution.
- Default is ALL. SMSPROT=NONE should be used with caution.
- VOLRESET=** **NO** — specifies that the end of a COPY operation FDR will not rename the SYS1.VTOCIX data set and the ABR model DSCB to match the new volume serial number. This is useful if the volume will be relabeled back to the original volume serial. This option has no effect if CPYVOLID=YES is specified.
- YES** — specifies that FDR is to rename these data sets and to reset the volume serial field in the DSCB if it matches the original volume serial. See notes under the FDR restore command (Section 10.05).
- NOTE: ON COPY THE DEFAULT IS NO. THESE DATA SETS WILL NOT BE RENAMED.**

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## 10.07 FDR DUMP EXAMPLES

The examples in the following section illustrate some of the FDR options. JOB and JOBLIB/STEPLIB DD statements are not shown.

Note that FDR determines the type of disk being processed from the UCB for the disk.

Note: In V5.1 and above, BUFNO=MAX is the default and need not be specified.

<b>DUMP ONE VOLUME</b>	Dump a 3380 disk volume to a 3480 tape cartridge.
	//DUMP EXEC PGM=FDR, REGI ON=1124K
	//SYSPRI NT DD SYSOUT=*
	//SYSUDUMP DD SYSOUT=*
	//DI SK1 DD UNI T=3380, DI SP=OLD, VOL=SER=123456
	//TAPE1 DD UNI T=3480, DSN=BACKUP. V123456, DI SP=(, CATLG), VOL=(, , 99)
	//SYSI N DD *
	DUMP TYPE=FDR
<b>CREATE DUPLICATE BACKUPS</b>	Dump a 3390 disk volume to tape, making two compressed backup copies.
	//DUMP EXEC PGM=FDR, REGI ON=2148K
	//SYSPRI NT DD SYSOUT=*
	//SYSUDUMP DD SYSOUT=*
	//DI SKA DD UNI T=3390, DI SP=OLD, VOL=SER=D33901
	//TAPEA DD UNI T=TAPE, DSN=BACKUP. COPY1, DI SP=(, KEEP)
	//TAPEAA DD UNI T=TAPE, DSN=BACKUP. COPY2, DI SP=(, KEEP)
	//SYSI N DD *
	DUMP TYPE=FDR, COMPRESS=ALL, DSNENQ=USE
<b>DUMP MULTIPLE VOLUMES SERIALY</b>	Dump three 3380 disk volumes sequentially to tape. Only one physical tape drive is used. The backups will be piggy-backed as three consecutive files on one or more tape volumes.
	//DUMP EXEC PGM=FDR, REGI ON=1124K
	//SYSPRI NT DD SYSOUT=*
	//SYSUDUMP DD SYSOUT=*
	//DI SK3 DD UNI T=3380, DI SP=OLD, VOL=SER=TS0001
	//TAPE3 DD UNI T=TAPE, DSN=BACKUP. VTS0001, DI SP=(, KEEP)
	//DI SK7 DD UNI T=3380, DI SP=OLD, VOL=SER=TS0002
	//TAPE7 DD DSN=BACKUP. VTS0002, DI SP=(, KEEP),
	// VOL=REF=*. TAPE3, LABEL=2, UNI T=AFF=TAPE3
	//DI SK9 DD UNI T=3380, DI SP=OLD, VOL=SER=TS0003
	//TAPE9 DD DSN=BACKUP. VTS0003, DI SP=(, KEEP),
	// VOL=REF=*. TAPE7, LABEL=3, UNI T=AFF=TAPE7
	//SYSI N DD *
	DUMP TYPE=FDR, DATA=USED, DSNENQ=USE
<b>DUMP OF A 3390-2 DASD</b>	Dump a 3390-2 to 3480 cartridges. A volume count must be specified since a backup of a 3390-2 may exceed the JCL default of 5 volumes (even if compression is used). ABEND S837 may result if the volume count is omitted.
	//DUMP EXEC PGM=FDR, REGI ON=2148K
	//SYSPRI NT DD SYSOUT=*
	//SYSUDUMP DD SYSOUT=*
	//DI SK1 DD UNI T=3390, DI SP=OLD, VOL=SER=D3390A <--- 3390-2
	//TAPE1 DD UNI T=3480, DI SP=(, CATLG),
	// DSN=BACKUP. D3390A, VOL=(, , 20)
	DUMP TYPE=FDR, COMPRESS=ALL, DSNENQ=USE

CONTINUED . . .



## 10.07 CONTINUED . . .

**DUMP  
MULTIPLE  
VOLUMES  
CON-  
CURRENTLY  
CREATING A  
DUPLICATE  
TAPE FOR ONE  
VOLUME**

Dump two 3380s and one 3390 concurrently to 3480 tape drives. One of the volumes, the 3390, will have two tape copies made. The data sets on the volumes will be enqueued during the backup. Only the used portions of the data sets will be dumped.

```
//DUMP      EXEC  PGM=FDR, REGI ON=3172K
//SYSPRI NT  DD    SYSOUT=*
//SYSUDUMP   DD    SYSOUT=*
//DI SK1     DD    UNI T=3380, DI SP=OLD, VOL=SER=111111
//TAPE1      DD    UNI T=3480, DSN=BACKUP. V111111, DI SP=( , KEEP) ,
//           VOL=( , , , 99)
//SYSPRI N1   DD    SYSOUT=*
//DI SK2     DD    UNI T=3380, DI SP=OLD, VOL=SER=222222
//TAPE2      DD    UNI T=3480, DSN=BACKUP. V222222, DI SP=( , KEEP) ,
//           VOL=( , , , 99)
//SYSPRI N2   DD    SYSOUT=*
//DI SK3     DD    UNI T=3390, DI SP=OLD, VOL=SER=333333
//TAPE3      DD    UNI T=3480, DSN=BACKUP. V333333. COPY1, DI SP=( , KEEP) ,
//           VOL=( , , , 99)
//TAPE33     DD    UNI T=3480, DSN=BACKUP. V333333. COPY2, DI SP=( , KEEP) ,
//           VOL=( , , , 99)
//SYSPRI N3   DD    SYSOUT=*
//SYSI N     DD    *
           DUMP  TYPE=FDR, DSNENQ=USE, DATA=USED, ATTACH
```

**DUMP ONE  
VOLUME  
WITH 3480  
IDRC**

Dump a 3380 disk pack to a 3480 tape cartridge using the 3480 IDRC hardware compression feature. You might want to use IDRC instead of the FDR compression feature (COMPRESS=) during times when the increased CPU utilization of COMPRESS= would impact system performance.

```
//DUMP      EXEC  PGM=FDR, REGI ON=1124K
//SYSPRI NT  DD    SYSOUT=*
//SYSUDUMP   DD    SYSOUT=*
//DI SK1     DD    UNI T=3380, DI SP=OLD, VOL=SER=ABR123
//TAPE1      DD    UNI T=3480X, DSN=BACKUP. V123456, DI SP=( , CATLG) ,
//           DCB=TRTCH=COMP
//SYSI N     DD    *
           DUMP  TYPE=FDR
```

CONTINUED . . .

## 10.07 CONTINUED . . .

**DUMP WITH  
RESERVE AND  
ONLY DUMP  
USED TRACKS**

Dump four disk packs to two tape drives concurrently. DISK1 and DISK2 will be dumped as separate files on the same tape drive, as will DISKA and DISKB. The volumes will be reserved during the dump. The number of errors is set to 1, so that any pack that encounters an I/O error will abend after the first error. Only the used portions of PS and PO data sets will be dumped.

```
//DUMP      EXEC  PGM=FDR, REGI ON=2148K
//SYSPRI NT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//DI SK1    DD   UNI T=3380, DI SP=OLD, VOL=SER=SYSRES
//TAPE1     DD   UNI T=TAPE, DI SP=( , KEEP) , DSN=BACKUP. SYSRES
//SYSPRI N1 DD   SYSOUT=*
//DI SK2    DD   UNI T=3380, DI SP=OLD, VOL=SER=PAGE01
//TAPE2     DD   VOL=REF=*. TAPE1, DI SP=( , KEEP) , DSN=BACKUP. PAGE01,
//          LABEL=2
//SYSPRI N2 DD   SYSOUT=*
//DI SKA    DD   UNI T=3380, DI SP=OLD, VOL=SER=PACK01
//TAPEA     DD   UNI T=TAPE, DI SP=( , KEEP) , DSN=BACKUP. PACK01
//SYSPRI NA DD   SYSOUT=*
//DI SKB    DD   UNI T=3380, DI SP=OLD, VOL=SER=MVSO02
//TAPEB     DD   VOL=REF=*. TAPEA, DI SP=( , KEEP) , DSN=BACKUP. MVSO02,
//          LABEL=2
//SYSPRI NB DD   SYSOUT=*
//SYSI N    DD
DUMP      TYPE=FDR, ENQ=RESERVE, MAXERR=1, DATA=USED, ATTACH
```

**DUMP WITH  
COMPAKTION  
USING THE  
DATA SET  
ENQUEUE  
OPTION**

FDR will dump two volumes using the COMPAKT option. The DISKA volume has COMPAKTOR order statements inserted. All data sets will be ENQUEUEEd on prior to the backup. Any data set which is not available will be marked as unmovable by CPK.

```
//FDRWCPK EXEC  PGM=FDR, REGI ON=2148K
//SYSPRI NT DD   SYSOUT=*
//SYSPRI N1 DD   SYSOUT=*
//SYSPRI NA DD   SYSOUT=*
//SYSMAP1 DD   SYSOUT=*
//SYSMAPA DD   SYSOUT=*
//CPKWORK DD   UNI T=SYSDA, SPACE=(CYL, ( 1, 1) )
//DI SK1    DD   UNI T=3380, VOL=SER=MASTER, DI SP=SHR
//DI SKA    DD   UNI T=3380, VOL=SER=PAYROL, DI SP=SHR
//TAPE1     DD   UNI T=TAPE, DSN=FDR. BACKUP, DI SP=( , KEEP)
//TAPEA     DD   UNI T=TAPE, DSN=FDR. PAYROL, DI SP=( , KEEP)
//SYSI N    DD   *
DUMP      TYPE=FDR, COMPAKT, DSNENQ=USE, ATTACH
//CPI NA    DD   *
CPK      PORLSE=ALL
SEQUENCE POS=VTOC
S        DSN=DATA. A
S        DSN=DATA. B
ENDSEQ
```

CONTINUED . . .

## 10.08 FDR RESTORE EXAMPLES

**FULL VOLUME RESTORE CHANGING THE VOLUME SERIAL** Restore a 3390 and a 3380 volume, changing the volsers of the disk volumes (DATA01 and DATA80) to the volsers of the volumes being restored (DATA12 and DATA85).

```
//RESTORE      EXEC    PGM=FDR, REGI ON=512K
//SYSPRI NT     DD      SYSOUT=*
//SYSUDUMP      DD      SYSOUT=*
//DI SK1        DD      UNI T=3390, DI SP=OLD, VOL=SER=DATA01
//TAPE1         DD      UNI T=TAPE, DSN=BACKUP. VDATA12, DI SP=OLD,
//              VOL=SER=(TOO100, TOO110, TOO120, TOO130)
//DI SKA        DD      UNI T=3380, DI SP=OLD, VOL=SER=DATA80
//TAPEA         DD      UNI T=TAPE, DSN=BACKUP. VDATA85, DI SP=OLD,
//              VOL=SER=(TOO200, TOO205, TOO235)
RESTORE        TYPE=FDR, CPYVOL I D=YES
```

**RESTORE RETAINING THE VOLID OF THE RECEIVING VOLUME** Restore a 3380 from tape without changing the volume serial of the receiving volume. The volume will be relabeled later to the volume serial of the volume which was dumped so VOLRESET=NO specifies that FDR will not rename the VTOCIX or ABR model. Neither the backed-up disk or the target disk can be SMS-managed.

```
//RESTORE      EXEC    PGM=FDR, REGI ON=512K
//SYSPRI NT     DD      SYSOUT=*
//SYSUDUMP      DD      SYSOUT=*
//DI SK1        DD      UNI T=3380, DI SP=OLD, VOL=SER=ALTRES
//TAPE1         DD      DSN=BACKUP. VMVSRES, DI SP=OLD
//SYSI N        DD      *
RESTORE        TYPE=FDR, CPYVOL I D=NO, VOLRESET=NO
```

**RESTORE SMS-MANAGED VOLUME** Restore a SMS-managed 3380 from a backup tape. Since the backup tape indicates it is a backup of a SMS-managed volume, the output volume must be marked as SMS-managed as well. Since a full-volume restore of an SMS volume to a new volser would result in uncataloged datasets in violation of SMS rules, CPYVOLID=YES is forced.

```
//RESTSMS      EXEC    PGM=FDR, REGI ON=512K
//SYSPRI NT     DD      SYSOUT=*
//SYSUDUMP      DD      SYSOUT=*
//DI SK1        DD      UNI T=3380, DI SP=OLD, VOL=SER=SMS001
//TAPE1         DD      DSN=BACKUP. VSMS001, DI SP=OLD
//SYSI N        DD      *
RESTORE        TYPE=FDR
```

CONTINUED . . .

## 10.08 CONTINUED . . .

**RESTORE  
3380-E  
TO 3380-K**

Convert a 3380-E (double density) to a 3380-K (triple density) volume, by restoring from a backup of the 3380-E. The volume serial of the 3380-K (D3380A) will be changed to the volume serial of the 3380-E (D3380B). If the original volume is mounted at the time of the restore, then the new volume will automatically be placed offline at the end of the restore; at that time, the original volume should be VARYed offline, and the new volume should be MOUNTed. Free space will automatically be adjusted to include the additional cylinders. If the original volume had an indexed VTOC, it must be rebuilt on the new volume (see next example).

```
//RESTORE      EXEC    PGM=FDR, REGI ON=512K
//SYSPRI NT     DD      SYSOUT=*
//SYSUDUMP      DD      SYSOUT=*
//DI SK1        DD      UNI T=3380, DI SP=OLD, VOL=SER=D3380A <- - - 3380-K
//TAPE1         DD      DSN=BACKUP. D3380B, DI SP=OLD <- - - 3380-E backup
//SYSI N        DD      *
                RESTORE  TYPE=FDR, CPYVOLID=YES
```

**REBUILD  
INDEXED  
VTOC**

Rebuild the indexed VTOC (VTOCIX) on any 3380. This will be required after any FDR restore or copy of a 3380 or 3390 to a different density 3380 or 3390. It will also be required after COMPAKTion to a new volume with CPYVOLID=YES, if the original volume serial was still online at the time. This example assumes that the SYS1.VTOCIX.vvvvvv data set exists on the volume but has been disabled.

```
//BUI LDI X     EXEC    PGM=I CKDSF
//SYSPRI NT     DD      SYSOUT=*
//DI SK1        DD      UNI T=3380, DI SP=OLD, VOL=SER=D3380A
//SYSI N        DD      *
                BUI LDI X  DDNAME(DI SK1)   I XVTOC
```

CONTINUED . . .

**10.09 FDR DISK COPY EXAMPLES****COPY A DISK  
VOLUME WITH  
DUPLICATE  
BACKUP**

Copy a 3390 volume to another 3390 volume, creating a backup on tape at the same time. The volume serial of the disk being copied to will be retained. All of the data sets on the volume being copied will be enqueued during the copy. Neither volume can be SMS-managed.

```
//COPY          EXEC   PGM=FDR, REGI ON=1024K
//SYSPRI NT     DD      SYSOUT=*
//SYSPRI N1     DD      SYSOUT=*
//SYSUDUMP      DD      SYSOUT=*
//DI SK1        DD      UNI T=3390, DI SP=OLD, VOL=SER=SYSRES
//TAPE1         DD      UNI T=3390, DI SP=OLD, VOL=SER=DUPRES
//TAPE11        DD      UNI T=TAPE, DI SP=( , KEEP) , DSN=SYSRES. BACKUP, VOL=( , , 20)
//SYSI N        DD      *
                COPY    TYPE=FDR, DSNENQ=HAVE
```

**COPY A DISK  
VOLUME  
CHANGING  
THE VOLUME  
SERIAL**

Copy a 3380 volume to another 3380 volume. The volume serial number of the receiving volume will be changed to the volume being copied. The output volume will automatically be set offline at the end of the restore. If the volume contains an Indexed VTOC, it will have to be separately rebuilt (See example in Section 10.08) after varying the original volume offline and mounting the output volume in its place.

```
//COPY          EXEC   PGM=FDR, REGI ON=1024K
//SYSPRI NT     DD      SYSOUT=*
//SYSPRI N1     DD      SYSOUT=*
//SYSUDUMP      DD      SYSOUT=*
//DI SK1        DD      UNI T=3380, DI SP=OLD, VOL=SER=DI SK01
//TAPE1         DD      UNI T=3380, DI SP=OLD, VOL=SER=DI SK02
//SYSI N        DD      *
                COPY    TYPE=FDR, CPYVOLI D=YES
```

**COPY FROM  
3380-E  
TO 3380-K**

Convert a 3380-E (double density) to a 3380-K (triple density) volume, with a direct disk-to-disk copy, creating a backup copy on 3480 cartridges as well. The volume serial of the 3380-K (D3380A) will be changed to the volume serial of the 3380-E (D3380B), and the new volume will automatically be placed offline at the end of the copy. At that time, the original volume should be VARYed offline, and the new volume should be MOUNTed. Free space will automatically be adjusted to include the additional cylinders (See Note 1). If the original volume had an indexed VTOC, it must be rebuilt on the new volume (See example in Section 10.08).

```
//COPY          EXEC   PGM=FDR, REGI ON=1024K
//SYSPRI NT     DD      SYSOUT=*
//SYSPRI N1     DD      SYSOUT=*
//SYSUDUMP      DD      SYSOUT=*
//DI SK1        DD      UNI T=3380, DI SP=OLD, VOL=SER=D3380B <--- 3380-E
//TAPE1         DD      UNI T=3380, DI SP=OLD, VOL=SER=D3380A <--- 3380-K
//TAPE11        DD      UNI T=3480, DI SP=( , CATLG) ,
//              DSN=BACKUP. D3380B, VOL=( , , 20)
//SYSI N        DD      *
                COPY    TYPE=FDR, CPYVOLI D=YES
```

Note 1: To adjust the free space, FDR turns on the DOS bit in the VTOC, and allocates a dummy data set to cause the system to call the VTOC conversion routine. The dummy data set that FDR allocates has a name that starts with "FDRABR.V". If your installation has a data security system, then the user running the restore or copy job must be authorized to ALLOCATE this dsname.

CONTINUED . . .

## 10.09 CONTINUED . . .

**COPY FROM  
3380-K  
TO 3380-E**

Convert a 3380-K (triple density) to a 3380-E (double density) volume, with a direct disk-to-disk copy. FDR will not normally allow a copy or restore to a smaller density disk; COMPAKTOR is recommended for that function. However, if the larger disk has no datasets allocated past the end of the smaller disk (cylinder 1769 in this example), FDR can do this copy or restore with PROT=none.

All of the comments in the previous example (COPY FROM 3380-E to 3380-K) apply.

```
//COPY          EXEC   PGM=FDR, REGI ON=1024K
//SYSPRI NT      DD     SYSOUT=*
//SYSPRI N1      DD     SYSOUT=*
//SYSUDUMP       DD     SYSOUT=*
//DI SK1         DD     UNI T=3380, DI SP=OLD, VOL=SER=D3380B <- - - 3380-K
//TAPE1          DD     UNI T=3380, DI SP=OLD, VOL=SER=D3380A <- - - 3380-E
//SYSI N         DD     *
                COPY    TYPE=FDR, CPYVOLI D=YES, PROT=NONE
```

CONTINUED . . .

**10.10 FDR AND ABR BACKUP MAINTENANCE**

Once backups on tape or disk have been created with FDR, FDRDSF, or FDRABR, you may need to do maintenance on those backups. This maintenance may be as simple as creating additional copies of FDR backups, or complex operations such as deleting obsolete ABR ARCHIVE backups.

Two utility programs are provided for backup maintenance:

- **FDRTCOPY** can be used to copy any FDR or ABR backup, and also performs special maintenance functions on ABR backups. It is included even for sites licensed only for FDR.
- **FDRTSEL** is used only with ABR; it automates copying and condensing of ABR backups.

***WARNING: Backups created by FDR, FDRDSF, SAR, and FDRABR are in a unique FDR format and cannot be correctly copied by programs other than FDRTCOPY and FDRTSEL. If you copy FDR-format backups with any other copy utility, such as the IBM utility IEBGENER, the copy may appear to be successful but any attempt to restore from the copied backup will fail. Similarly, programs which transmit files from one computer site to another will usually corrupt FDR backups. The FATAR Tape utility (another Innovation product) can also copy FDR backup tapes. If you must copy FDR tapes with other copy or transmission utilities, please contact Innovation for assistance.***

**COPYING  
FDR BACKUPS**

During an actual backup, you can create 1 or 2 copies of the backup file simultaneously. However, it may be more convenient to create the second copy at a later time, or you may want more than 2 copies. **FDRTCOPY** can do this.

All backups created by FDR, FDRDSF, FDRABR, or SAR have the same internal format. In its simplest usage, the **FDRTCOPY** utility can be used to make an exact copy of any FDR-format backup. It can also be used to copy backups on disk to tape, or vice versa.

While doing the copy, **FDRTCOPY** will also validate the internal format of the backup, verifying the structure of the data blocks and also verifying that all data which is supposed to be on the tape is actually present and readable.

The data set names and locations of non-ABR backups are totally under the user's control. The **FDRTCOPY** JCL for copying non-ABR tapes must point to the input backup, and the name and location of the copy is also specified in the JCL.

**COPYING  
ABR BACKUPS**

Backups created by **FDRABR** use special naming conventions, and those backups are recorded by ABR, in the ABR catalog for full-volume and incremental backups, and in the Archive Control File for ARCHIVE backups and application backups. The **FDRTCOPY** and **FDRTSEL** utilities have special support for copying ABR backups. They recognize the ABR backup data set names, can copy multiple backup files from an input backup, and will update the appropriate ABR records to record the copies.

**FDRTSEL** automates the copy process, looking up the selected backups in the ABR catalog or Archive Control File and dynamically allocating the input backups.

**FDRTCOPY** can also be used to directly copy ABR backups, but the user must point, via JCL, to the backup file to be copied (or the first file on a backup tape). Innovation recommends the use of **FDRTSEL** for most ABR backup copying.

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## 10.10 CONTINUED . . .

**ABR ARCHIVE  
MAINTENANCE**

FDRTSEL has other important functions for ABR ARCHIVE backups.

- It automates the movement of expired (or about to expire) ARCHIVE backups on disk to tape. This is a key step if you have structured your ARCHIVE jobs to place the first copy on disk with a short term retention (for quick auto-recall) but want to move that copy to tape with a longer retention when it reaches its first expiration.
- It can copy your existing ARCHIVE backup tapes and eliminate the backups of disk data sets which have expired and are no longer needed. The output copy will be significantly smaller than the original since it will contain only the remaining active disk data sets, and will free up tapes in your library.
- It may be used for migration from one type of tape to another, such as 3480 to 3490E or Magstar (3590). Since the newer tapes hold much more data on a volume, this can also greatly reduce the number of tape volumes required to hold your archival data.



**10.11 FDR TAPE COPY (FDRTCOPY)**

**OVERVIEW** The FDR tape copy utility (FDRTCOPY) has been specifically designed to copy FDR-formatted backups on tape or disk. The FDR format is used by all backups created by FDR, FDRDSF, FDRABR, or SAR (Stand-Alone Restore). **As noted in [Section 10.10](#), FDR backups cannot be correctly copied by any non-Innovation utilities.**

FDRTCOPY may be used to copy any FDR backup, from disk or tape, to disk or tape, optionally creating a second copy at the same time. Backups in FDR compressed format can be copied, and FDRTCOPY can create compressed output from uncompressed input, and vice versa. Simple JCL and control statements are used to specify the input and output backup data sets.

**COPYING  
ABR BACKUPS**

When the input is ABR-created backup or archive files, FDRTCOPY has the ability to:

- Automatically copy multi-file tapes (tapes containing multiple backups or archives stacked on tape by ABR).
- Create replacement copies of backups, i.e., create and catalog data sets with the same name as the input.
- Create duplicate copies of backups, i.e., create COPY2 backups from COPY1 input, or vice versa.
- Create additional copies (COPY3 through COPY9) of full-volume and incremental backups.
- Drop expired backup files during a multi-file copy, allowing reduction and consolidation of incremental and archive files.
- Update the ABR Archive Control File if archive files are copied.

FDRTCOPY will automatically recognize that input backups were created by ABR based on their format of their data set names. The dsname format of ABR-created backups is described in detail in [Section 52.05](#), but briefly it is:

abrindex.Vvolser.xczzzzzz

where "abrindex" is a fixed index (usually "FDRABR"), "volser" is the volume serial of a disk volume, "x" is "C" for backups and other characters for archives and application backups, "c" is a copy number (1-9), and "zzzzzz" is variable data. FDRTCOPY gets the usual "abrindex" from the FDR/ABR Global Option Table, but note that the "abrindex" may be any user-chosen value for Application Backups (DUMP TYPE=APPL).

FDRTCOPY will do a pattern-match on the input data set name to see if it meets the requirements for an ABR backup (if you do not wish FDRTCOPY to identify ABR backups, e.g., if you want to copy an ABR backup to a non-ABR backup name, specify "ABR=NO" on the COPY control statement). When the input is on tape, the tape label only contains the last 17 characters of the dsname, so FDRTCOPY cannot verify the "abrindex" and checks only the remainder. If an input file is identified as ABR-created, the following rules apply ([See Section 10.13 for the meaning of the FDRTCOPY operands](#)):

- the input data set name will always be copied to the output data set (COPYDSN=YES is assumed). The output name will be identical to the input unless ABRCOPY= and/or ABRCOPY2= is specified; these operands allow you to change the copy number "c" in the dsname.
- the output data sets will be cataloged unless CAT= and/or CAT2= is specified (CAT=RECAT is the default).
- if the input is identified as an archive backup, FDRTCOPY will attempt to update the Archive Control File to point to the output backup.
- if the end of the last input tape is reached without finding the end of the backup data (as indicated by internal FDR control blocks), FDRTCOPY will attempt to locate the backup in the ABR catalog to get the remainder of the backup tape volume serials. This allows you to copy an ABR tape set while specifying only the first input tape (or first few tapes) in the JCL.
- If ALLFILES or MAXFILES= is also specified, FDRTCOPY will copy multiple ABR files from the input tape(s). Since ABR-created backups are normally multi-file, this allows all the backups on a tape set to be copied without specifying anything except the first file to be copied. If necessary, it will use the ABR catalog to get the additional tape volser for each backup, until either the number of files specified by MAXFILES= has been reached, or a double tape mark (indicating the end of the tape set) is encountered.

Files which are not identified as ABR-created will not receive this special processing.

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## 10.11 CONTINUED . . .

**COPYING  
BACKUP  
SUBSYSTEM  
TAPES**

FDRTCOPY can be used to copy ABR full-volume and incremental backup tapes. The JCL must point to the input backup (or the first backup on a multi-file tape). Given the nature of the backups created by ABR, it is not always easy to make up standard JCL to copy the tapes created by ABR every day, but [Section 10.15](#) contains some sample JCL that can be used to do so.

This might be used to create a duplicate copy in a separate run, rather than using the TAPExx facility of ABR to create the duplicate at dump time; you might do this if you don't have enough tape drives or if you are trying to reduce the dump elapsed time. It can also be used to create additional duplicate copies for offsite storage; ABR supports restoring from copy numbers 3 through 9, but they can be created only by FDRTCOPY. FDRTCOPY can also be used to recreate a backup from a duplicate copy when the original has been damaged or lost.

When copying backup files, FDRTCOPY always copies the ABR-created data set name ([See Section 52.05](#)), but the copy number in the name can be changed by using the ABCOPY=/ABRCOPY2= operands.

Since ABR uses only the ABR catalog to locate backup subsystem tapes, it is essential that the output files created by FDRTCOPY be cataloged. The default of CAT=RECAT and CAT2=RECAT will ensure that the output files are always cataloged; this is especially important when you are recreating tapes which are already cataloged to different volumes.

FDRTSEL can also be used to automate the copying of ABR incremental and full volume backups. FDRTSEL can select the backups from the ABR catalog and dynamically allocate the inputs, eliminating the FDRTCOPY requirement for JCL pointing to the backups. FDRTSEL also has options for ordering the backups to improve restore performance. [See Section 10.15](#).

**COPYING  
ARCHIVE  
SUBSYSTEM  
TAPES**

FDRTCOPY can be used to copy ABR archive backup tapes. The JCL must point to the input backup (or the first backup on a multi-file tape); [Section 10.14](#) contains some sample JCL that can be used to automate these copies.

Archive backups are recorded in the Archive Control File. They may also be cataloged in the ABR catalog, but ABR does not use the catalog entries for restore unless the backup exceeds 5 tape volumes. The structure of the Archive Control File only allows copy numbers 1 and 2 to be recorded; when FDRTCOPY copies an archive backup file and the output file copy number is 1 or 2, it updates the Archive Control File using this technique:

- The ID of the input file (data set name, tape volser, and file sequence number) are noted.
- The ID of the equivalent output file (name, tape volser, file sequence number, expiration date and device type) are also noted.
- The Archive Control File is searched for any archive data set which is identified as being archived on the input file (both COPY1 and COPY2 are checked against the input file ID).
- When a match is found, the ID of the output file is inserted into the slot for COPY1 or COPY2, depending on which copy number appears in the output file name.

With this technique, you can create a COPY2 from a COPY1 input, and FDRTCOPY will find the proper entries from the COPY1 name and add the COPY2 ID. If you are copying an archive tape using the same copy number, FDRTCOPY will replace the old backup IDs with the new volume serials, device type, and expiration.

FDRTCOPY will only update the Archive Control File if you point to that file, by providing an ARCHIVE DD statement, or, if the file to be updated is the one named in the ABR global option table, by specifying the DYNARC operand.

CONTINUED . . .

**10.11 CONTINUED . . .****MOVING  
ARCHIVE FILES  
FROM DISK**

Although FDRTCOPY is capable of moving archive files from disk to tape, the procedure is laborious so it is not convenient to do so. FDRTSEL is a utility which can automate the process of copying disk archive files to tape, invoking FDRTCOPY to do the actual move. FDRTSEL is especially useful if you archive to disk with short-term retention, and want to create tape copies of those files when they expire.

FDRTCOPY is also capable of moving archive backups from disk to disk, but again the process is laborious. FDRTSEL can also automate this process.

Documentation on FDRTSEL is found in [Section 10.15](#).

**APPLICATION  
BACKUP FILES**

It is possible to use FDRTCOPY to copy backups created by ABR's Application Backup (DUMP TYPE=APPL), but it is usually not useful. Application backup creates a Control File describing the backups, similar to the Archive Control File, but the usual process for application backup involves putting a backup of that Control File as the last file on the backup tape, in order to make that tape self-contained. FDRTCOPY can copy the backup tapes, and can update the Control File if it is still on disk, but it cannot update the backup of the Control File on the tape.

If you are using a variation of Application Backup which only creates a disk Control File, you may use FDRTCOPY on those backup; you will need to provide a ARCHIVE DD statement pointing to the control file, and you must use the ABRINDEX= operand to specify the high-level index used for those backups.

FDRTSEL contains features which can be used for copying Application Backups.

**SUPPORTED  
DEVICES**

Since FDRTCOPY uses standard access methods, all tape devices and disk devices supported by your operating system are supported by FDRTCOPY. The input and output device types do not need to be the same, so FDRTCOPY can be used to copy backup data sets from disk to tape, or from one tape device type or density to another (such as 3400 tape reel to 3490E or Magstar (3590) tape cartridge). The output files may occupy more or fewer volumes than the original input.

**10.12 FDRTCOPY JCL REQUIREMENTS**

FDRTCOPY requires the following JCL to execute ([See Section 10.14 for examples](#)):

<b>EXEC STATEMENT</b>	Specifies the program name (FDRTCOPY), and region requirement. A region of 1M is adequate for all functions.
<b>STEPLIB DD STATEMENT</b>	If required, specifies the load library in which FDRTCOPY resides. It must be an APF authorized library.
<b>SYSPRINT DD STATEMENT</b>	Specifies the output message data set. Normally a SYSOUT data set.
<b>SYSUDUMP DD STATEMENT</b>	Specifies the abend dump data set. Although not required, we strongly urge you to always include this DD statement, so that we can help you diagnose error conditions. Usually specifies a SYSOUT data set.
<b>TAPEIN DD STATEMENT</b>	<p>Specifies the first or only input tape or disk FDR backup data set. If the input is on tape and the ALLFILES or MAXFILES= are specified, the TAPEIN DD statement must specify all required information to OPEN the first file to be copied. At least DSN= and DISP= must be given; if the input data set is not cataloged then UNIT=, VOL=, and possibly LABEL= must also be given.</p> <p>If a multi-file, multi-volume ABR tape set is to be copied, normally only the first tape volume serial in the set must be given; FDRTCOPY will locate the additional volumes in the set in the ABR catalog. However, if some of the backups in the set are no longer cataloged, it may be necessary to specify <b>all</b> of the volume serials in the VOL= parameter.</p> <p>On tape, the copy may start at a file other than File 1 by specifying the file number in the LABEL=nn JCL parameter; however, the full data set name of the first file being copied must always be given.</p> <p>The ddname 'TAPEIN' may be overridden by the TAPEIN= parameter on the COPY statement.</p>
<b>TAPEOUT DD STATEMENT</b>	<p>Specifies the primary output tape or disk to be created.</p> <p>The data set name specified will be overridden if COPYDSN=YES is specified on the COPY statement, or if the first input file is identified as an ABR-created backup. However, a proper data set name <b>must</b> be given on TAPEOUT or the system may treat this as a temporary data set.</p> <p>If multiple files are being copied, <b>do not</b> specify "DISP=(NEW,CATLG)"; <b>instead</b> use "DISP=(NEW,KEEP)" and use the CAT= parameter of the COPY statement to catalog output data sets.</p> <p>If more than 5 output tape volumes may be required, you must specify a volume count in the VOL= parameter, e.g., "VOL=(,,99)". Innovation recommends always specifying a volume count when the output is on tape.</p> <p>You may want to specify the RETPD= or EXPDT= JCL parameters to specify the expiration of the output file, but note that the EXP= operand in FDRTCOPY may override that expiration. If the output tapes already contain data, the copy may start beyond the existing files by specifying the starting file number in the LABEL=n JCL parameter.</p> <p>If the output is on disk, the DD statement can create the output file (with DISP=(NEW,KEEP) or (NEW,CATLG) and SPACE=) or can refer to an existing output file (DISP=OLD). However, remember that if COPYDSN=YES is specified (see the next section), the data set name copied from the input is the name that must exist on the output disk.</p> <p>TAPEOUT may be DUMMY; TAPEIN will still be read. This is useful to verify the readability of the input files, since FDRTCOPY will validate the contents and format of the backup file (Note: if the input file is compressed, specify COMPRESS=NONE for full validation).</p> <p>The DDNAME 'TAPEOUT' may be overridden by the TAPEOUT= parameter on the COPY statement.</p>

CONTINUED . . .

**10.12 CONTINUED . . .**

**TAPE2OUT DD STATEMENT** (Optional) Specifies that a second output copy is to be created. All comments about 'TAPEOUT' above apply to 'TAPE2OUT'. The ddname 'TAPE2OUT' may be overridden by the TAPE2OUT= parameter on the COPY statement. If a TAPEOUT2 DD is present, it will be treated as an alias for TAPE2OUT. If the TAPE2OUT and TAPEOUT2 DDs are omitted, then the TAPEOUT file will be the only copy created.

**ARCHIVE DD STATEMENT** (Optional) Specifies the ABR Archive Control File. If ABR-created ARCHIVE backups are copied, this DD statement is required if the Control File is to be updated to point to the new copies unless the DYNARC parameter is specified on the COPY statement. COPYDSN=YES must be specified if the Archive Control File is to be updated for the first file copied. The ddname 'ARCHIVE' may be overridden by the ARCDD= parameter on the COPY statement.

NOTE: If both the ARCHIVE DD statement and the DYNARC parameter are omitted when an ARCHIVE backup is copied, the Archive Control File will not be updated with the information about this copy. This backup can only be restored using the TAPEDD option of the RESTORE TYPE=ABR command.

**SYSIN DD STATEMENT** Specifies the control statement data set. Usually an input stream or DD \* data set.

## 10.13 FDRTCOPY CONTROL STATEMENTS

**COPY STATEMENT** The COPY control statement must be present for FDRTCOPY to execute. However, all parameters are optional.

SYNTAX	COPY	<p><b>ABR=</b><u>YES</u> <u>NO</u> ,<b>EXP=</b><u>NO</u> <u>COPY</u> <u>DROP</u> <u>JCL</u></p> <p><b>,ABRCOPY=</b><u>SAME</u> <u>FLIP</u> <u>n</u> ,<b>LASTAPE=</b>dsname</p> <p><b>,ABRCOPY2=</b><u>SAME</u> <u>FLIP</u> <u>n</u> <b>MAXERR=</b>nn</p> <p><b>,ABRINDEX=</b>prefix <b>,NEWABRINDEX=</b>prefix</p> <p><b>,ALLFILES</b> <b>,PRINT=</b>DSN</p> <p><b>,MAXFILES=</b>nn <b>,SIMULATE</b></p> <p><b>,ARCBDSN=</b>dsname <b>,SMSEXPIRE=</b>YES</p> <p><b>,ARCDD=</b>ddname <b>,TAPEIN=</b>ddname</p> <p><b>,ARCEXPIRE=</b><u>UPDATE</u> <u>KEEP</u> <u>NOT99000</u> <b>,TAPEOUT=</b>ddname</p> <p><b>,CAT=</b><u>NO</u> <u>YES</u> <u>RECAT</u> <b>,TAPE2OUT=</b>ddname</p> <p><b>,CAT2=</b><u>NO</u> <u>YES</u> <u>RECAT</u> <b>,TAPERRCD=</b>NO</p> <p><b>,COMPRESS=</b><u>ALL</u> <u>COPY1</u> <u>COPY2</u> <u>NONE</u> <b>,TAPEXP=</b>EXPDT RETPD</p> <p><b>,COPYDSN=</b>YES</p> <p><b>,DROP=</b>(EXPIRE,ARCBDSN,LASTAPE)</p> <p><b>,DYNARC</b></p> <p><b>,NODYNARC</b></p>
OPERANDS	ABR=	<p><b>YES</b> – specifies that FDRTCOPY will look for and recognize ABR-created input files by the format of their data set names and invoke special processing for such files. <a href="#">See Section 10.11</a> for details.</p> <p><b>NO</b> – specifies that FDRTCOPY will not recognize ABR formatted names on the input. NO should be used if you wish to copy ABR-created backups to non-ABR data set names.</p> <p>Default is YES.</p>
	ABRCOPY= ABRCOPY2=	<p>If an input file is recognized as an ABR-created file these parameters control the copy number in the data set names of the equivalent output files. ABRCOPY= controls TAPEOUT, ABRCOPY2= is for TAPE2OUT (if present). The copy number is the digit in the second position in the last level of the data set name.</p> <p><b>SAME</b> – specifies that the copy number is not modified.</p> <p><b>FLIP</b> – indicates that it will be "flipped" to COPY 2 if COPY 1 is input, or to 1 if COPY 2 is input; this is especially useful for creating a second copy for offsite storage.</p> <p>'n' is a single digit from 1 to 9 and sets the copy number. Incremental backups may have COPY 1 through 9 recorded in the ABR catalog, but archive backups may only have COPY 1 or COPY 2 recorded in the Archive Control File. These parameters may not be used with disk output.</p> <p>Default is SAME.</p>

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## 10.13 CONTINUED . . .

- ABRINDEX=** Specifies the high level qualifier or prefix to be used in determining the fully-qualified data set name of ABR-created backup files. ABR files have a fixed naming convention (See [Section 52.05](#)) and FDRTCOPY supplies the hi-level index from the FDR/ABR Global Option Table.  
But Application Backups (DUMP TYPE=APPL) may use a different prefix. To use FDRTCOPY to copy these application backups and recognize them as ABR files, you can specify ABRINDEX=userindex, where the 'userindex' is the first level qualifier of the application backup data set name.
- ALLFILES** – requests that all files on the input tape volumes be copied; the copy ends when the last file or last volume is detected (double tape mark or end of volume list).  
**MAXFILES=nn** – requests the same processing except that no more than 'nn' files will be copied.  
For files beyond the first, COPYDSN=YES is forced.  
These parameters may not be used with disk input or output.  
Default is to copy one file.
- ARCBDSN=** Specifies a data set name (up to 44 characters). The last 17 characters of the name will be compared to the dsname in tape labels on the input tapes to identify backup control files created by the ABR option ARCBACKUP=DSF (See [Section 51](#)). If the name ends in ".G0000V00", then the comparison will match on *any* GDG generation (any values in place of the zeros). The full dsname will be used to open the input file and the equivalent file on the output tape. If the DROP=ARCBDSN option is specified, these files will not be copied to the output tape. If omitted, no check for ARCBACKUP=DSF files will be done.
- ARCDD=** Specifies the DDNAME of the ABR Archive Control File. If ABR archive files are copied by FDRTCOPY, this DD statement must be present for the Archive Control File to be updated, unless DYNARC is specified.  
Default is ARCHIVE.
- ARCEXPIRE=** When Archive or Application Backup files are being copied, this operand controls what expiration date will be recorded in the Control File for the output files created. See the "EXP=" operand for an explanation of how the expiration date of each output file is calculated.  
**UPDATE** – specifies that the Control File will be updated with the new calculated expiration date.  
**KEEP** – specifies that the expiration date currently recorded in the Control File will be left undisturbed. However, if the backup being recorded does not already exist (such as creating a new COPY 2 from a COPY 1), the calculated expiration will be recorded.  
**NOT99000** – if the expiration of the output file is 99000 (tape management catalog control), operate as if KEEP was specified, otherwise operate like UPDATE. This should be used if you keep your tapes under catalog control but record an actual expiration date in the Control File.  
Default is UPDATE.

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## 10.13 CONTINUED . . .

**CAT=**  
**CAT2=**

These two parameters control cataloging of data sets written by FDRTCOPY onto TAPEOUT and TAPE2OUT, respectively. Cataloging will be done only if the full data set name is known, i.e., if the first data set is being copied, if the original name was 16 characters or less, or if the data set was an ABR-created backup. When copying archive backups, the output file will be cataloged only if the equivalent input file was cataloged.

**NO** – inhibits cataloging.

**YES** – will cause the output data sets to be cataloged unless the name is already cataloged.

**RECAT** – catalogs even if it is already cataloged (updates the catalog).

NOTE: If both CAT= and CAT2= request cataloging, but the data set name on both output files is the same, only the data set on TAPEOUT will be cataloged.

Default is NO, except that if ABR=YES is in effect and the input file is identified as an ABR-created backup, the default is RECAT. If CAT= is specified but CAT2= is not, and there is a TAPE2OUT DD present, the default for CAT2= will be the value specified for CAT=. (see note at end of section)

**COMPRESS=**

**ALL** – specifies that all output backups will be in FDR compressed format.

**COPY1** – causes only backups on TAPEOUT to be compressed.

**COPY2** – causes only backups on TAPE2OUT to be compressed.

**NONE** – inhibits compression of any output.

Default is ALL if TAPEIN data is compressed, NONE if it is not.

NOTE: if the input file is compressed, and all output files are also compressed, then FDRTCOPY copies the data blocks without first decompressing and recompressing them, to reduce CPU time. However, in this case, some of the validation normally done by FDRTCOPY will be bypassed.

**COPYDSN=**

**YES** – specifies that for the first or only data set copied, the TAPEOUT/TAPE2OUT data set name will be the same as the input name (if an ABR-created file, the copy number may be modified if the ABRCOPY=/ABRCOPY2= parameters are present). The data set name is always copied for all files other than the first when using ALLFILES/MAXFILES=.

Default is to use the data set name on the TAPEOUT/TAPE2OUT DD statement. However, if ABR=YES is in effect and the first input file is identified as an ABR-created backup, COPYDSN=YES is forced. (see note at end of section)

**DROP=**

Specifies conditions under which certain files on the input tapes will not be copied to the output.

**EXPIRE** – specifies input files which have reached their expiration dates (as recorded in the input tape label or disk DSCB) will not be copied (if the expiration on the input tape label is '99000', the data set will be considered expired if it is not cataloged, except for archive backup files which may not be cataloged).

**ARCBDSN** – if the ARCBDSN= operand described above is also specified, any ARCBACKUP=DSF files identified on the input tape will not be copied to the output tape.

**LASTAPE** – if the LASTAPE= operand described below is also specified, any LASTAPE files identified on the input tape will not be copied to the output tape.

You may specify any or all of the values of DROP=, placing them in parentheses if more than one is present, e.g., DROP=(EXPIRE, LASTAPE)

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## 10.13 CONTINUED . . .

**DYNARC**  
**NODYNARC**

**DYNARC** – requests that the ABR Archive Control File named in the FDR/ABR Global Option Table be dynamically allocated for updating if Archive backups are copied.

**NODYNARC** – specifies that the Archive Control File will not be updated unless an ARCHIVE DD statement is present.

If NODYNARC is specified, no ARCHIVE DD is supplied, and Archive backups are being copied, a warning message will be issued to document that no Control File is being updated, which may make the backup copies unusable.

Default is NODYNARC. However, if ABR=YES is in effect, the input file is identified as an ABR-created Archive or Application Backup and no ARCHIVE DD statement is supplied, DYNARC is the default. (see note at end of section)

**EXP=**

Controls how FDRTCOPY will calculate the expiration date of output files. Also see the TAPEEXP= operand.

**NO** – specifies that no expiration date processing will be done; the expiration date of output files will be obtained from the RETPD= or EXPDT= operands on the TAPEOUT/TAPE2OUT DD statements; if not specified there, an expiration date of 00.000 (already expired) will be assumed even though your operating system or tape management system may provide other defaults.

**COPY** – requests that the expiration date of each output file will be copied from the equivalent input file (from the tape label or disk DSCB).

**DROP** – is the same as COPY, except that input files whose expiration dates have been reached will not be copied. Although this option is still supported, we recommend using the DROP=EXPIRE operand in its place.

**JCL** – if a RETPD= or EXPDT= operand is specified on the TAPEOUT or TAPE2OUT DD statement, it will be honored. Otherwise, the expiration date will be copied from the equivalent input file (from the tape label or disk DSCB). EXP= is supported for disk input. For disk output, the expiration will not be copied regardless of the EXP= operand.

NOTE: FDRTCOPY can copy only the expiration date recorded in the tape label or disk DSCB when the data set was created. Expirations that were changed in the Control File with the FDRARCH utility or changed in your tape management system are not known to FDRTCOPY.

Default is JCL.

**LASTAPE=**

Specifies a data set name (up to 44 characters). The last 17 characters of the name will be compared to the dsname in tape labels on the input tapes to identify dummy files created by the ABR option LASTAPE (See Sections 50 and 51). The full dsname will be used to open the input file and the equivalent file on the output tape. If the DROP=LASTAPE option is specified, these files will not be copied to the output tape. If omitted, no check for LASTAPE files will be done.

**MAXERR=**

Specifies the number of input file I/O errors and the number of block length errors that may occur before FDRTCOPY will abend the copy function (the count for these two conditions is maintained separately).

Default is 10 errors.

**NEWABRINDEX=** When ABR=YES is in effect, and the input file is identified as an ABR-created backup, this specifies that FDRTCOPY will replace the high-level index of the output data set name (the "abrindex") with the specified value (1 to 8 characters). This is intended for use with Application Backups (DUMP TYPE=APPL).

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## 10.13 CONTINUED . . .

<b>PRINT=</b>	<b>DSN</b> – specifies that FDRTCOPY is to list the names of the data sets and ICF VSAM components that are present in the backup file being copied.  Default is not to list those names.
<b>SIMULATE</b>	Specified that FDRTCOPY is to only validate all operands on the COPY statement. No input or output files will be opened.
<b>SMSEXPIRE=</b>	Only honored when ABR=YES is in effect and the input file being copied is identified as an ABR-created Archive backup. This is primarily for use when FDRTCOPY is called by FDRTSEL. <b>YES</b> – causes the expiration date of the output file in the Archive Control File to be copied from the expiration of the existing COPY 2 of the same backup. This is designed to be used with Archive backups created with the ABR option SMSEXPIRE=YES, which sets the COPY 1 and COPY 2 expirations from SMS management class parameters. When the COPY 1 on disk (expiration set from LEVEL 1 DAYS NON USAGE) is moved to tape, it gets the same expiration as the COPY 2 (which was set to the final expiration of the archive). The actual expiration of the output backup file on tape should be set by EXPDT= or RETPD= to a value larger than any of the individual expirations (or perhaps EXPDT=99000 for catalog control).
<b>TAPEIN=</b>	Overrides the TAPEIN DDNAME.
<b>TAPEOUT=</b>	Overrides the TAPEOUT DDNAME.
<b>TAPE2OUT=</b>	Overrides the TAPE2OUT DDNAME.
<b>TAPERRCD=</b>	<b>NO</b> – Specifies that output tape I/O errors, if recovered by forcing a new output volume, will not cause any error indication at FDRTCOPY termination.  Default is output tape I/O errors cause a U0888 abend at step termination, although the copy may complete successfully.

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## 10.13 CONTINUED . . .

**TAPEXP=**

When copying the expiration of an input tape to an output tape (see EXP=), FDRTCOPY may not be able to tell if the expiration date recorded in the tape label is a real expiration date, or was a keyword meaningful to a tape management system. This operand tells FDRTCOPY how to handle the copied expiration date.

**EXPDT** – specifies that FDRTCOPY will pass the input expiration date to the output tape as if EXPDT= was specified. For dates prior to 1997 or past 1999, these should be treated by your tape management system as a real date, but for dates in the range of 1998 to 1999 (and perhaps 1997 for CA-TLMS), they may be treated as keywords with special meanings.

**RETPD** – specifies that FDRTCOPY will pass all the input expiration dates to the output tape as if RETPD= was specified. This means that your tape management system will treat them all as real expiration dates (with the possible exception of xx000 expirations).

The default is RETPD unless the expiration date being passed is 99000 (tape management catalog control) when EXPDT is assumed. Since keyword dates other than 99000 are rarely used with ABR, this default is usually the correct choice. Override it only when you know that the default will not give correct results.

**NOTE:** The defaults for the CAT=, CAT2=, COPYDSN= and DYNARC operands have changed for FDRTCOPY V5.2 level 60 when ABR=YES is in effect and the input file is identified as an ABR-created backup. These defaults are different from V5.2 and earlier releases. However, Innovation feels that these changed defaults reflect the way that FDRTCOPY is used most of the time; i.e., that these operands are almost always specified when copying ABR backups, and that incorrect results can occur if they are omitted. These changes will prevent errors and reduce the required operands for many operations.

## 10.14 FDRTCOPY EXAMPLES

**COPY FDR OR  
DSF BACKUP**

Copy a FDR or DSF backup data set. UNIT= and VOL=SER= are specified, but if the input backup was cataloged, they could be omitted; in that case the backup could be on tape or disk. If the backup occupied multiple tape volumes, VOL=SER=(vol1,vol2,,) would be specified. Since COPYDSN=YES is NOT specified, the data set name on the TAPEOUT DD statement will be used. TAPEOUT specifies a volume count in case more than 5 output tape volumes are required.

```
//FDRTCOPY EXEC PGM=FDRTCOPY, REGI ON=1M
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//TAPEI N DD DSN=FDR. BACKUP, DI SP=OLD,
// UNI T=TAPE, VOL=SER=B00023
//TAPEOUT DD DSN=FDR. COPY, UNI T=TAPE,
// DI SP=(NEW, KEEP), VOL=(, , , 255)
//SYSI N DD *
COPY
/*
```

**COPY ABR  
BACKUP  
CREATING  
TWO COPIES**

Copy an ABR-created incremental backup tape, creating one copy which will replace the original, and a second copy which will be cataloged as a COPY2. ABRCOPY2=FLIP requests that the data sets on TAPE2OUT have their copy numbers "flipped", in this case from COPY1 to COPY2. CAT=RECAT and CAT2=RECAT is assumed so the COPY1 files will replace the original files in the catalog, and the COPY 2 files will be cataloged. EXP=JCL is assumed, but since there is no expiration or retention specified in the JCL, the original expiration dates of the input files are copied to the output tapes. The first backup to be copied is located through the ABR catalog, since UNIT= and VOL= are not specified. Since ALLFILES is specified, all of the backups on the tape set, starting with the specified backup, are copied. If the backups extended to multiple tape volumes, FDRTCOPY will locate the additional volumes through the ABR catalog and automatically call for them to be mounted.

```
//FDRTCOPY EXEC PGM=FDRTCOPY, REGI ON=1M
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//TAPEI N DD DSN=FDRABR. VSYRES. C1000101, DI SP=OLD
//TAPEOUT DD
DSN=DUMM1, UNI T=3480, VOL=(, , , 255), DI SP=(NEW, KEEP)
//TAPE2OUT DD
DSN=DUMM2, UNI T=3480, VOL=(, , , 255), DI SP=(NEW, KEEP)
//SYSI N DD *
COPY ALLFI LES, ABRCOPY2=FLI P
/*
```

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## 10.14 CONTINUED . . .

**COPY AN ABR  
ARCHIVE TAPE**

Copy a multi-volume ABR archive tape (which is probably also multi-file), creating a "COPY1" from a "COPY2" tape, and update the ABR Archive Control File (archived data sets cannot be easily restored from archive tapes unless the Control File is updated). ABRCOPY=FLIP causes the copy number in the input file to be changed from "2" to "1". LABEL=RETPD=90 causes the expiration date of the output file, in the tape labels, the Archive Control File, and the tape management system (if any) to be set to 90 days from today. The ARCHIVE DD statement is necessary for Archive Control File updating unless DYNARC is specified. Even though multiple volumes are to be copied, only the first volume serial needs to be specified on the TAPEIN DD statement; in most cases, FDRTCOPY can locate the other volumes required from the ABR catalog.

```
//FDRTCOPY    EXEC    PGM=FDRTCOPY, REGI ON=1M
//SYSPRI NT    DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//ARCHI VE     DD      DSN=FDRA BR. ARCHI VE, DI SP=SHR
//TAPEI N      DD      DSN=FDRA BR. VTS0001. B296120A, UNI T=CART,
//              VOL=SER=A00021, DI SP=(OLD, KEEP)
//TAPEOUT      DD      DSN=DUMM1, UNI T=TAPE, LABEL=RETPD=90,
//              DI SP=(NEW, KEEP), VOL=( , , 255)
//SYSI N       DD      *
COPY          ALLFI LES, ABRCOPY=FLI P
/*
```

**RECREATE A  
DAMAGED  
ABR TAPE**

An ABR tape (backup or archive) has been damaged or lost, so its duplicate copy is copied to recreate it. Even though only one volume of a multi-volume backup is damaged it is easiest to recreate the entire set of volumes. ABRCOPY=FLIP causes the copy number to "flip" from the good copy that of the copy being replaced. EXP=JCL is assumed but since no expiration is specified it copies the expiration date from the input files. This example shows reading a COPY2 archive to recreate a COPY1, but the input could be COPY2 or could be a backup. The DYNARC operand will cause the Archive Control File to be updated to point to the new copy, if the input is an archive tape.

```
//FDRTCOPY    EXEC    PGM=FDRTCOPY, REGI ON=1M
//SYSPRI NT    DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//TAPEI N      DD      DSN=FDRA BR. VTS0001. B290020A, UNI T=TAPE,
//              VOL=SER=A00079, DI SP=(OLD, KEEP)
//TAPEOUT      DD      DSN=DUMM1, UNI T=TAPE,
//              DI SP=(NEW, KEEP), VOL=( , , 99)
//SYSI N       DD      *
COPY          ALLFI LES, ABRCOPY=FLI P, DYNARC
/*
```

**COPY BACKUP  
ON DISK TO  
TAPE**

Copy a sequential disk FDR backup file to tape. The DISP= parameters shown will cause the disk file to be deleted and the tape copy to be cataloged if the copy is successful.

```
//FDRTCOPY    EXEC    PGM=FDRTCOPY, REGI ON=1M
//SYSPRI NT    DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//TAPEI N      DD      DSN=FDR. BACKUP. VPRODO3,
//              DI SP=(OLD, DELETE, KEEP)
//TAPEOUT      DD      DSN=FDR. BACKUP. VPRODO3, UNI T=TAPE,
//              DI SP=(NEW, CATLG, KEEP)
//SYSI N       DD      *
COPY          ALLFI LES, ABRCOPY=FLI P, DYNARC
/*
```

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## 10.14 CONTINUED . . .

**AUTOMATED  
COPY OF  
ABR TAPES**

FDRTCOPY requires that the full data set name of the first data set to be copied be provided. The naming convention for ABR-created backup data sets causes the data set names to change with every ABR run, so a daily FDRTCOPY job would need to be manually updated every day. The following example is a technique to automate the copying of these tapes and avoid having to manually update JCL for each run.

FDRTCOPY can copy a file that was not created by FDR or ABR as long as it is empty, containing no records. These empty files will be copied but will not be cataloged, and will not generate an error. You can create an empty file of a known name as the first file on the ABR tape, using IEBGENER, and use that name in the FDRTCOPY JCL. In this example, the dummy file is a GDG, so the appropriate GDG index must be created beforehand; a non-GDG could also be used.

Note that if an ABR begins over on a new scratch tape (as after an abend of a backup task, or if the MAXFILES= value is reached) the files created after that point will NOT be included in the copy created by FDRTCOPY.

**Changes to the Backup JOB.**

```

//*          Create a Dummy data set as first file on tape
//DUMMYFIL   EXEC   PGM=IEBGENER
//SYSPRI NT   DD     SYSOUT=*
//SYSIN       DD     DUMMY
//SYSUT1      DD     DUMMY, DCB=(RECFM=FB, BLKSIZE=80)
//SYSUT2      DD     DSN=FDRA BR. DUMMY. BKUP(+1),
//              UNI T=TAPE, DI SP=(, CATLG), VOL=(, RETAI N)
//*          Do an ABR Backup, starting at second file
//ABRSTEP     EXEC   PGM=FDRA BR
//TAPE1       DD     DSN=FDRA BR. DUMMY1, VOL=REF=*. DUMMYFIL. SYSUT2
//              LABEL=(2, SL), DI SP=(, KEEP)
//*              (remainder of ABR job step)

```

**Changes to the FDRTCOPY JOB.**

```

//*          Copy current backups relate to
the dummy          cataloged data set.
//
//TCOPY       EXEC   PGM=FDRTCOPY, REGI ON=1M
//SYSPRI NT   DD     SYSOUT=*
//TAPEIN      DD     DI SP=OLD, DSN=FDRA BR. DUMMY. BKUP(0)
//TAPEOUT     DD     DSN=DUMM1, UNI T=TAPE,
//              DI SP=(NEW, KEEP), VOL=(, , , 99)
//SYSIN       DD     *
COPY          ALLFI LES, ABRCOPY=2

```

**10.15 FDRTSEL INTRODUCTION**

**FUNCTION** FDRTSEL automates the function of copying and moving ABR backup files.

**For ARCHIVE backups:**

- If you ARCHIVE with one copy to disk, FDRTSEL can move those disk archive backups to tape when they have reached (or are about to reach) their expiration dates, assigning the new tape copy a longer expiration. This allows you to create "level 1" archives on disk for quick recall, and later migrate them to "level 2" tape for longer retention. Criteria other than expiration date can be used when selecting backups for migration.
- FDRTSEL can be used to move archive backups from one media to another, such as disk to disk, tape to tape, or disk to tape.
- FDRTSEL can be used to recycle or consolidate archive tapes, by eliminating the archive backups of disk data sets that are no longer required (such as those that are expired, deleted, or recalled). It produces a set of output tapes which are smaller and use fewer volumes than the original, reducing the size of the archive tape library.
- FDRTSEL can create COPY 2 backups from COPY 1 if they were not created at ARCHIVE time, and can recreate one copy from the other if a copy is damaged or lost.

**For Full-volume and incremental backups:**

- Incremental and full-volume ABR backups can be copied. You can use this to create COPY 2 backups from COPY 1 if they were not created at backup time. Additionally, FDRTSEL can create extra off-site copies (3-9) and can recreate a copy from another if a copy is damaged or lost.
- FDRTSEL can be used to organize a generation's worth of backups for one or more disk volumes in order to minimize tape handling during disaster/recovery restores.

**FUNCTIONAL DESCRIPTION** FDRTSEL internally invokes FDRTCOPY ([See Section 10.11](#)) to copy individual backups, but it automates selection and allocation of input files.

If copying or moving ARCHIVE files, FDRTSEL first invokes an ARCHIVE utility to scan the Archive Control File and select the archive backups that meet the user-specified selection criteria. It then allocates the first selected archive backup to the TAPEIN DDNAME and invokes FDRTCOPY to copy the archive backup to TAPEOUT (and TAPE2OUT), and to update the Archive Control File to reflect the new archive backup volumes. If the input backup is on disk, a successfully copied backup may optionally be scratched (and uncataloged if appropriate). The above process is repeated for each selected archive backup.

If copying ABR incremental or full volume backups, FDRTSEL first invokes an ABR catalog processor to select the backups that meet the user specified selection criteria. FDRTSEL then allocates the first selected ABR backup file to the TAPEIN DDNAME and invokes FDRTCOPY to copy the BACKUP file to TAPEOUT (and TAPE2OUT), and to catalog the created copies in the ABR catalog. The above process is repeated for each selected ABR incremental or full volume backup.

**FEATURES** These features of FDRTSEL enhance its utility. Some of them were available in earlier releases of FDRTSEL, but may have been enhanced.

- ARCEDIT – when copying ARCHIVE backups, allows a partial copy of the Archive backup files by selecting or excluding certain of the original archived disk datasets (usually excluding expired datasets).
- LAST TAPE – allows you to add new files onto a tape created by a previous execution of FDRTSEL.
- DISK OUTPUT – allows FDRTSEL to copy backups from disk to disk. Can be used to move backups to new volumes, to convert the backups to a new device type (such as 3380 to 3390) or can be used in conjunction with ARCEDIT to reduce the size of the backups.
- CHECKPOINT/RESTART – allows long-running FDRTSEL jobs to be restarted after a failure or interruption.
- CONSOLE CONTROL – allows FDRTSEL to be interrupted gracefully (between backups) via a console command.

**10.16 FDRTSEL JCL REQUIREMENTS**

FDRTSEL requires the following JCL to execute:

<b>EXEC STATEMENT</b>	Specifies the program name (FDRTSEL) and region requirement. The recommended region size is 4M or larger.
<b>STEPLIB DD STATEMENT</b>	If required, specifies the load library in which FDRTSEL resides. It must be an APF authorized library.
<b>SYSPRINT DD STATEMENT</b>	Specifies the output message data set. Normally a SYSOUT data set.
<b>SYSUDUMP DD STATEMENT</b>	Specifies the abend dump data set. Although not required, we strongly urge you to always include this DD statement, so that we can help you diagnose error conditions. Usually specifies a SYSOUT data set.
<b>TAPEIN DD STATEMENT</b>	Must <b>not</b> be present. It will be dynamically allocated by FDRTSEL.
<b>TAPEOUT DD STATEMENT</b>	Specifies the destination for the primary or only output copy to be created by FDRTSEL. The ddname 'TAPEOUT' may be overridden by the TAPEOUT= parameter on the COPY statement.  SIMULATION: If CONTROL SIM is specified, you may omit TAPEOUT or specify it as: //TAPEOUT DD DUMMY  TAPE OUTPUT: If outputting to tape or cartridge, specify:  UNIT= specify a generic (e.g., 3490) or esoteric (e.g., CART) name to allocate the type of tape drive desired. If you have sufficient tape drives available, specifying a unit count of 2 (e.g., UNIT=(3490,2)) may reduce elapsed time.  DISP=(NEW,KEEP) – do not specify CATLG since FDRTSEL handles cataloging of output files internally.  VOL= specify a volume count (e.g., VOL=(,,255)) to prevent FDRTSEL from abending if more than 5 tape volumes are required. If no volume serials are specified, FDRTSEL will call for scratch tapes; this is recommended; however, you may specify up to 255 tape volume serials.  LABEL= you may want to specify RETPD=nnn or EXPTD=yyddd to provide the expiration date of the backups. See the EXP= parameter in <a href="#">Section 10.13</a> for details on handling of expirations.  If multiple backups are copied, FDRTSEL will create multiple files on the tape (or tape aggregate if more than one tape volume is used).  EXAMPLE:       //TAPEOUT DD DSN=ABR1, UNIT=3490, DISP=(NEW, KEEP), // VOL=(, , , 255), LABEL=EXPDT=99000

CONTINUED . . .



## 10.16 CONTINUED . . .

**TAPEOUT DD STATEMENT (Continued)** LAST TAPE OPTION: The LAST TAPE option of FDRTSEL allows you to add backup files to a tape created by a previous FDRTSEL step (even if that step is in another job and even if it was run on a previous day). This option is controlled entirely through JCL. To request LAST TAPE, the TAPEOUT DD is similar to that described above except that you specify:

DSN= any name that includes an index level of "LASTAPE". You may have multiple LASTAPE files for various purposes. This name will be cataloged to record the tape volume serial and file number where FDRTSEL is to start its output.

DISP=(MOD,KEEP) – this tells FDRTSEL to locate the LASTAPE file in the catalog, verify that the file exists on the output tape, and begin outputting to the tape at that point. If the name is not cataloged, FDRTSEL will call for a scratch tape and begin at file 1. Also, if you specify NEW instead of MOD, FDRTSEL will ignore the LASTAPE file and use scratch tapes (but it will still record the LASTAPE for future use).

VOL= volume serials should not be specified, but the volume count should be given.

```
EXAMPLE:      //TAPEOUT      DD      DSN=TECH. LASTAPE. COPY1,
              //              UNI T=3490, DI SP=(MOD, KEEP) ,
              //              VOL=( , , 255) , LABEL=EXPDT=99000
```

DISK OUTPUT: You may request that FDRTSEL copy the backups to disk. This is usually used with ARCHIVE backups, not full-volume or incremental backups. Disk output can only be requested if the input backup files are also on disk. In this case the TAPEOUT DD is used only to specify one or more disk volumes on which the backups will be placed; FDRTSEL will internally allocate the required backup files on those output disks.

To request disk output, specify the UNIT= device type, DISP=OLD, and VOL=SER= one or more disk volume serials, e.g.,

```
//TAPEOUT DD UNI T=3390, DI SP=OLD, VOL=SER=( ARCO01, ARCO02, ARCO03)
```

Alternately, you may catalog a dummy dataset to a set of output volumes and refer to that name in the JCL (remember that the name itself will not be used, only the volser list it points to), e.g.,

```
//TAPEOUT DD DI SP=OLD, DSN=FDRABR. POOLDI SK
```

**NOTE: output disk volumes cannot be SMS-managed.**

**TAPE2OUT DD STATEMENT** (Optional) Specifies the duplicate output tape or disk copy to be created. All comments about 'TAPEOUT' above apply to TAPE2OUT.

The ddname 'TAPE2OUT' may be overridden by the TAPE2OUT= parameter on the COPY statement. If a TAPEOUT2 DD is present, it will be treated as an alias for TAPE2OUT. If the TAPE2OUT and TAPEOUT2 DDs are omitted, then the TAPEOUT file will be the only copy created.

**ARCHIVE DD STATEMENT** Specifies the ABR Archive Control File to be used to identify archive backups to be copied when SELECT ARCHIVE is used. This ARCHIVE file will also be updated to reflect the results of the copy. If omitted, the DYNARC option will be assumed.

**TSELCKPT DD STATEMENT** (Optional) Specifies the Checkpoint recovery file. Its usage is described in [Section 10.22](#). If included, it should be allocated with JCL similar to:

```
//TSELCKPT DD DSN=PROD. TSEL. CHECKP, UNI T=DI SK, SPACE=(CYL, (2, 1)) ,
//          DI SP=(MOD, CATLG)
```

This will create and catalog the file if it does not exist, and will use it if it does exist. If the file is new or empty, FDRTSEL will write checkpoint information to it. But if it is not empty at initialization, FDRTSEL will automatically perform a restart. If FDRTSEL completes successfully, it will rewrite the file as empty, ready for the next FDRTSEL execution.

CONTINUED . . .

**10.16 CONTINUED . . .**

**SYSIN DD STATEMENT** Specifies the control statement data set. Usually an input stream or DD \* data set.

**RETURN CODES** FDRTSEL will end with a return code as shown in this table:

0 (zero)	All Functions ended normally
4	All completed functions ended normally, but FDRTSEL was terminated prematurely because of the MAXFILES= operand (on the CONTROL statement) or because of a STOP console command.
8	An error occurred (other than a FDRTCOPY error).
12	An FDRTCOPY error occurred

If no backups match the selection criteria, FDRTSEL will end with return code of 8, unless SELTERR=NO is specified. If SELTERR=NO, FDRTSEL will end with return code of 0 when there are no matching backups.

**10.17 FDRTSEL CONTROL STATEMENTS**

FDRTSEL accepts three primary control statements. These statements cannot be repeated. Each statement can only appear once within a given execution of FDRTSEL.

- COPY or MOVE – Specifies FDRTCOPY output processing options. MOVE also causes input disk files to be scratched.
- SELECT – Selects ABR files to be processed.
- CONTROL – Specifies additional FDRTSEL options. Can be used to indicate simulation mode. CONTROL is optional.

**SELECT  
STATEMENT**

The SELECT statement identifies backup data sets to be copied or moved in ONLY ONE of three modes:

SELECT ARCHIVE is used to copy or move whole archive backup data sets. The SELECT ARCHIVE statement invokes FDRABRP to generate a list of backup data sets to be processed. All FDRABRP options available to PRINT ARCHIVE are honored by the SELECT ARCHIVE statement.

SELECT ARCDIT is identical to the SELECT ARCHIVE statement with one major difference. With SELECT ARCDIT, only the specifically requested individual data sets from the selected backup file get copied.

SELECT CATLG is used to copy ABR full-volume and incremental backup files. This statement creates a backup selection list by processing the ABR catalog.

**10.18 FDRTSEL COPY/MOVE STATEMENT**

**COPY/MOVE STATEMENT** The COPY or MOVE statement must be present. The MOVE statement can be used only with disk input; it causes the input backup file to be scratched (and uncataloged if appropriate) after it is successfully copied. COPY can be used with either disk or tape input, and it does not disturb the input backup; however, depending on your options, the output backup will may be cataloged in place of the input.

SYNTAX	COPY	,ABRCOPY= <u>SAME</u>  FLIP n	,MAXERR=nn
	MOVE	,ABRCOPY2= <u>SAME</u>  FLIP n	,NEWABRINDEX=prefix
		,ABRINDEX=prefix	,PRINT=DSN
		,ARCEXPURE= <u>UPDATE</u>  KEEP NOT99000	,SIMULATE
		,CAT= <u>NO</u>  YES RECAT	,SMSEXPURE=YES
		,CAT2= <u>NO</u>  YES RECAT	,TAPEOUT=ddname
		,COMPRESS=ALL COPY1 COPY2 NONE	,TAPE2OUT=ddname
		,DYNARC	,TAPERRCD=NO
		,NODYNARC	,TAPEXP=EXPDT RETPD
		,EXP=NO COPY DROP JCL	

All of the operands of COPY and MOVE shown above are also operands of the FDRTCOPY COPY statement; they will actually be passed to FDRTCOPY when it is invoked by FDRTSEL. Please see [Section 10.13](#) for the descriptions of these operands.

**However, note these differences:**

- Only those operands shown above are supported by FDRTSEL. Other FDRTCOPY operands documented in [Section 10.13](#) are not supported and should not be specified.
- If SELECT CATLG is used, the default for ABRCOPY= is set by the IFNOCOPY= or COPY= operands on that statement.
- If the SIM operand on the CONTROL statement is specified ([See Section 10.21](#)), then FDRTSEL will not even call FDRTCOPY. If that operand is not specified, but the SIMULATE operand is specified on the COPY/MOVE statement, FDRTSEL will allocate all of the required input files and invoke FDRTCOPY but FDRTCOPY will only validate its operands and exit.
- You should usually not specify the EXP= operand. For disk-to-disk MOVES, EXP=NO will result in incorrect operation (EXP=COPY is the default in that case). For all other operations, the default of EXP=JCL will usually result in the correct results.

**10.19 FDRTSEL SELECT ARCHIVE/ARCEDIT STATEMENT**

NOTE: Only one form of the SELECT statement can be used per execution of FDRTSEL. Only one SELECT ARCHIVE, SELECT ARCEDIT or SELECT CATLG statement can be present in a given job step.

**SELECT ARCHIVE STATEMENT** The SELECT ARCHIVE statement is used to specify the criteria for selection of the archive backup data sets to be copied or moved. The most of the operands of the SELECT ARCHIVE statement are identical to the PRINT ARCHIVE statement of FDRABRP (See Section 53.05) with the following restrictions and additions:

- The IFONLYCOPY= operand limits the selection of the archive backups to those backups for which the other copy does not exist;
- The COPY= or IFONLYCOPY= operand must be specified to indicate which copy of the backup is to be processed.
- The BKDEVTYPE= and BKVOL= operands may be used to select based on the backup type and/or volume serials.

FDRABRP will be internally invoked to process the Archive Control File and select archived data sets according to the operands you specify. If multiple selection criteria are specified, only those archived data sets which match all of them are selected. Note that if any one archived data set in a given archive backup is selected, the entire backup will be processed.

**SELECT ARCEDIT STATEMENT** The SELECT ARCEDIT statement can be used instead of the SELECT ARCHIVE statement. The ARCEDIT function operates exactly the same as the SELECT ARCHIVE, with the only exception being that it "edits" the archive backup file written to TAPEOUT to include only the archived data sets that were selected from the Archive Control File. ALL other keywords and functions are identical to the SELECT ARCHIVE statement.

<b>SYNTAX</b>	<b>SELECT S</b>	<b>ARCHIVE ARCEDIT</b>  <b>,ADATE=yyddd</b>  <b>,BKDEVTYPE=<u>DISK</u> TAPE ANY</b>  <b>,BKVOL=(vvvvvv,...,vvvvvv)</b>  <b>,COPY=1 2</b>  <b>,EXPIRE=YES NO</b>  <b>,IFONLYCOPY=1 2</b>	<b>,PDATE=yyddd</b> <b>,PDAYS=nnnn</b>  <b>,RESTORED=YES NO</b>  <b>,SDATE=yyddd</b> <b>,SDAYS=nnnn</b>  <b>,SELTERR=<u>YES</u> NO</b>  <b>,VOL=(vvvvvv,...,vvvvvv)</b>  <b>,XDAYS=nnn</b>
---------------	---------------------	---	--

<b>SELECT ARCHIVE OPERANDS</b>	<b>ADATE=</b>	Specifies the Julian date (yyddd) that the data set was archived. FDRTSEL will only SELECT the data sets which match this date.  The default is that the date is not checked.
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## 10.19 CONTINUED . . .

- BKDEVTYP=** **DISK** – Specifies the selection is limited to only those archive backups that reside on disk.  
**TAPE** – Specifies the selection is limited to only those archive backups that reside on a tape media. This is determined by the presence of a file number for the backup COPY1 or COPY2 information.  
**ANY** – Either disk or tape backups may be selected.  
The default is DISK.
- BKVOL=** Specifies one or more volume serials or volser prefixes of archive backup volumes; only those archive entries indicated as being archived to one of those volumes will be selected. These may be either tape or disk volume serials. To specify a volser prefix, follow the prefix with an asterisk (\*). For example, BKVOL=ARCH\* selects all volumes whose serials begin with ARCH. Multiple volume serial numbers may be specified if entered in parentheses, e.g., BKVOL=(ARCH\*,ARC001). Note that the backup volume is only compared for the specific COPY= being selected.  
The default is that the backup volume serial will not participate in data selection.  
The BKVOLG= operand, used in previous releases to select a backup volume prefix, is still accepted.
- COPY=** Specifies which backup copy (1 or 2) is to be copied or moved. If COPY=2 is specified backups which do not have a COPY 2 will be bypassed.  
FDRTSEL requires the COPY= or IFONLYCOPY= keyword to be specified.  
Use COPY=n to unconditionally create a copy of this FDR file.
- EXPIRE=** **YES** selects ONLY the archived data sets whose selected copy (the COPY= or IFONLYCOPY= operand) has expired (past their expiration date) plus data sets that will expire within the number of days specified by the XDAYS= operand.  
**NO** selects only the archived data sets that have not expired (not past their expiration date).  
The default is no expiration date check is made.
- IFONLYCOPY=** The IFONLYCOPY= operand limits the selection to those backups for which the other copy does not exist. To create a COPY 2 of any selected backup that does not already have a COPY 2, specify IFONLYCOPY=1.  
FDRTSEL requires that either the COPY= or the IFONLYCOPY= keyword must be specified. Use IFONLYCOPY=n to create copies for which the other copy does not exist.
- PDATE=** Specifies that ONLY data sets archived on or BEFORE the Julian date (yyddd) specified will be selected. This option can reduce execution time if many data sets have been archived.
- PDAYS=** Specifies a value in days which is subtracted from today's date to calculate a prior Julian date. This date is used as described above by PDATE operand.  
This option can reduce execution time if many data sets have been archived.  
If neither PDATE= nor PDAYS= is specified, the default is that the entire Archive Control File will be searched.
- RESTORED=** **YES** results in the selection of data sets that have been successfully restored by ABR.  
**NO** results in selection of data sets that have not been restored.  
The default is that no checks are made for restored data sets.

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## 10.19 CONTINUED . . .

- SDATE=** Specifies that ONLY data sets archived on or after the Julian date (yyddd) specified will be selected. This option can reduce execution time if many data sets have been archived.
- The default is that the entire Archive Control File will be searched.
- SDAYS=** Specifies a value in days which is subtracted from today's date to calculate a prior Julian date. This date is used as described above by SDATE operand. This option can reduce execution time if many data sets have been archived.
- If neither SDATE= nor SDAYS= is specified, the default is that the entire Archive Control File will be searched.
- SELTERR=** **YES** – Specifies that a condition code of 12 will be set if there are no archived data sets that match the selection criteria on the SELECT.  
**NO** – Specifies that a condition code of 0 will be set if there are no archived data sets matching the selection criteria on the SELECT and there are no other errors.
- The default is YES.
- VOL=** Specifies one or more DASD volume serials or volser prefixes; only those archive entries indicated as being archived from one of those volumes will be selected. To specify a volser prefix, follow the prefix with an asterisk (\*). For example, VOL=TSO\* selects all volumes whose serials begin with TSO. Multiple volume serial numbers may be specified if entered in parentheses, e.g., VOL=(IPL001,MVS230,WORK03)
- The default is that the DASD volume serial will not participate in data selection.
- The VOLG= operand, used in previous releases to select a DASD volume prefix, is still accepted.
- XDAYS=** Specifies a value in days which is added to today's date to calculate a future expiration date.  
XDAYS= is used with EXPIRE=YES to select data sets that will expire in the next nnn days.
- The default is 10 days, but is ignored unless EXPIRE=YES is coded.

## 10.20 FDRTSEL SELECT CATLG STATEMENT

**SELECT CATLG STATEMENT** The SELECT CATLG statement is used to select ABR full-volume and incremental backups to be copied. The syntax of the SELECT CATLG statement is similar to the PRINT CATLG statement of FDRABRP ([See Section 53.06](#)) with the following restrictions and additions:

- The IFNOCOPY=*n* keyword limits the copies to be made to ABR backups which do not already have a copy "*n*".
- You can specify which copy to use as input by SOURCE=*n*.
- MAXGEN defaults to 1, selecting only the most recent generation, all cycles.

SYNTAX	SELECT S	CATLG	,MAXCYC= <i>nn</i>  ,BKDEVTYP=DISK TAPE  <u>ANY</u>  ,COPY= <i>n</i>  ,CYCLES= <i>nn</i>  ,GEN= <i>nnnn</i>  ,IFNOCOPY= <i>n</i>	,MAXGEN= <i>nnnn</i>  ,SELTERR= <u>YES</u>  NO  ,SOURCE= <i>n</i>  ,TYPE=ABR FDR  ,VOL=( <i>vvvvvv</i> ,..., <i>vvvvvv</i> )
--------	-------------	-------	--	--

SELECT CATLG OPERANDS	BKDEVTYP=	<p><b>DISK</b> – Specifies the selection is limited to only those backups that reside on disk.</p> <p><b>TAPE</b> – Specifies the selection is limited to only those backups that reside on a tape media. This is determined by the presence of a file number in the ABR catalog entry.</p> <p><b>ANY</b> – Either disk or tape backups may be selected.</p> <p>The default is ANY.</p>
	COPY=	<p>Specifies the copy number (1 to 9) you want to create even if that copy already exists. This value is passed to FDRTCOPY as ABRCOPY=<i>n</i>. The default (if the IFNOCOPY= keyword is not specified) is COPY=2.</p> <p>Note that if your JCL includes a TAPE2OUT DD statement (to create a second output copy), you must give the copy number of that copy by including the ABRCOPY2=<i>n</i> operand on the COPY or MOVE statement.</p>
	CYCLES=	<p>Specifies the number of cycles (across generations) from and including the most current backup to be copied. This keyword can be used to select the <i>nn</i> most recent backups, independent of their generation.</p> <p>This keyword must not be specified with MAXGEN= or MAXCYC=.</p>
	GEN=	<p>Specifies a specific generation number to be used for selection. If backups for this specific generation exist for the volume, they will be selected.</p> <p>This keyword can not be used with MAXGEN= or CYCLES=.</p>
	IFNOCOPY=	<p>The IFNOCOPY= operand limits the copying selection to only backups for which you don't already have a copy "<i>n</i>" (1 to 9). For example, to create a COPY 2 of any backup for which the COPY 2 does not exist, specify, IFNOCOPY=2. This value is passed to FDRTCOPY as ABRCOPY=<i>n</i>.</p>

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## 10.20 CONTINUED . . .

<b>MAXCYC=</b>	<p>Specifies the number of cycles to be selected from each generation of a given disk volume. The order of selection will be most recent to least recent.</p> <p>The default is that ALL cycles within a generation will participate in the selection.</p>
<b>MAXGEN=</b>	<p>Specifies the number of generations to be copied for each disk volume. Starting from the most current to the least current (highest number to lowest).</p> <p>The default is only the current generation will be used for selection of backups.</p>
<b>SELTERR=</b>	<p><b>YES</b> – Specifies that a condition code of 12 will be set if there are no cataloged backups that match the selection criteria on the SELECT.</p> <p><b>NO</b> – Specifies that a condition code of 0 will be set if there are no cataloged backups matching the selection criteria on the SELECT and there are no other errors.</p> <p>The default is YES.</p>
<b>SOURCE=</b>	<p>Specifies the copy number (1 to 9) of the ABR backup to be used as input. All output copies will be generated from the SOURCE= copy. This copy must be cataloged in the ABR catalog.</p> <p>The default is to use the Copy1 (C1) file.</p>
<b>TYPE=</b>	<p><b>FDR</b> – limits the selection to only FDR full volume backups. (cycle = 00)</p> <p><b>ABR</b> – limits the selection to only ABR incremental backups. (cycle &gt; 00)</p> <p>The default is to use both full volume and all incremental backups in the selection process.</p>
<b>VOL=</b>	<p>Specifies one or more DASD volume serials or volser prefixes; selection will be limited to backups of those volumes. To specify a volser prefix, follow the prefix with an asterisk (*). For example, VOL=(MVS*,TSO*,PROD01) selects all volumes whose serials begin with MVS and TSO plus the volume PROD01.</p> <p>The default is that all cataloged backups are eligible for selection.</p>

## 10.21 FDRTSEL CONTROL STATEMENT

**CONTROL STATEMENT** The CONTROL statement is optional. It specifies FDRTSEL processing options.

<b>SYNTAX</b>	<b>CONTROL</b>	<b>ABRINDEX=</b> prefix  <b>,ARCBACKUP=</b> DSF <b>,ARCB1DSN=</b> dsname <b>,ARCB2DSN=</b> dsname  <b>,MAXFILES=</b> nnnn  <b>,NOPOOL</b>  <b>,SIM</b>	<b>,STACK=</b> YES NO VOLUME nnn <b>,STACK2=</b> YES NO VOLUME nnn  <b>,STOPCC=</b> nnn  <b>,TMS NOTMS</b>  <b>,UNIT=</b> 1 2  <b>,UPPER</b>
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**CONTROL OPERANDS**    **ABRINDEX=**    Specifies the ABR prefix (first index level) of the ABR ARCHIVE and BACKUP files to be copied. This may be used with application backups (DUMP TYPE=APPL, [see Section 51](#)).

The default is to use the ABRINDEX in the ABR global options table (usually "FDRABR").

**ARCBACKUP=DSF**    When copying Archive or Application Backup files, directs FDRTSEL to invoke FDRDSF to DUMP the Archive Control File used in this step as the last file on the tape once all files have been copied. This operates the same as the ARCBACKUP=DSF option of ABR.

If the ARCB1DSN= and/or ARCB2DSN= operands are not specified, FDRTSEL will name these files on the tape by changing the index level "ARCHIVE" in the Archive Control File data set name to "ARCBKUP" for TAPEOUT and "ARCBKU2" for TAPE2OUT.

**ARCB1DSN=**  
**ARCB2DSN=**    Specifies the data set names to be used on TAPEOUT (ARCB1DSN=) and TAPE2OUT (ARCB2DSN=) for the backup of the Archive Control File if the ARCBACKUP=DSF operand is also specified. The default names are described under ARCBACKUP= above.

**MAXFILES=**    Specifies the maximum number (1 to 9999) of ARCHIVE or BACKUP files to be copied in this FDRTSEL step. Once this limit is reached FDRTSEL terminates. Files not processed may be selected in a subsequent run.

The default is that all selected files will be copied.

**NOPOOL**    For use when TAPEOUT is on disk. This option directs FDRTSEL to allocate the new copy of the backup file on the disk volumes in the order as specified in the TAPEOUT DD statement. By default, it will reorder the volumes in the list according to the amount of free space on each volume.

**SIM**    Invokes a simulation mode, and generates a report detailing the archive or backup files which would be copied. This is recommended for testing FDRTSEL options. Note that FDRTCOPY will not be invoked, and many options on the COPY/MOVE statement will not be validated (use the SIMULATE option on COPY/MOVE without the SIM option on CONTROL to test COPY/MOVE options).

CONTINUED . . .

## 10.21 CONTINUED . . .

<b>STACK=</b> <b>STACK2=</b>	<p>Controls how output files are stacked on TAPEOUT (STACK=) and TAPE2OUT (STACK2=), i.e., whether multi-file output tapes will be created.</p> <p><b>YES</b> – Stack up to 255 files.</p> <p><b>NO</b> – Create only one file per output tape.</p> <p><b>VOLUME</b> – Stack all the selected backups related to the same disk volume on one set of output tapes.</p> <p><b>nnn</b> – Stack up to nnn files (1 to 255).</p> <p>If the stack limit is reached, FDRTSEL will call for a fresh scratch tape (or the next tape in the TAPEOUT volume list if supplied) and start with file sequence 1.</p> <p>The default is YES.</p>
<b>STOPCC=</b>	<p>When premature termination of FDRTSEL is requested via the operator command "P jobname" or "F jobname,STOP" (<a href="#">See Section 10.22</a>), FDRTSEL shuts down processing files at the completion of the current file. STOPCC= specifies the step return code to be set to indicate that this has occurred. The default is 4.</p>
<b>TMS</b> <b>NOTMS</b>	<p>Specifies the Tape Management System (TMS) option for use with the LAST TAPE option (<a href="#">See Section 10.22</a>).</p> <p><b>NOTMS</b> causes FDRTSEL to overwrite the LASTAPE file on the previous tape when adding new files to the tape.</p> <p><b>TMS</b> causes it to add new files after the previous LASTAPE file for compatibility with tape management.</p> <p>The default is taken from the TMS option in the FDR/ABR Global Options table (ISPF panel A.I.4.4).</p>
<b>UNIT=</b>	<p>Directs FDRTSEL to request 1 or 2 tape devices when allocating input backups to be copied; 2 units may improve performance by minimizing waits for tape mounts and rewinds.</p>
<b>UPPER</b>	<p>By default, FDRTSEL issues messages in upper and lower case print characters. If you require that all messages to be printed in UPPER case only, specify this option.</p>

**10.22 FDRTSEL FEATURES AND CONSIDERATIONS**

This section describes some special features of FDRTSEL, and considerations for using the features of FDRTSEL.

**LAST TAPE  
SUPPORT**

FDRTSEL has LAST TAPE support, similar to the LAST TAPE option in FDRABR ([described in Section 51](#)). LAST TAPE support allows you to add new files onto a tape created by a previous execution of FDRTSEL in a previous step or job, even if that job was run on an earlier day. LAST TAPE works only with tape output.

To use LAST TAPE, change the data set name in the TAPEOUT and/or TAPE2OUT DD statements to include a qualifier of "LASTAPE" anywhere in the name, e.g., "DSN=PROD.ARCHIVE.LASTAPE" or "DSN=TECH.LASTAPE.DAILY". You must also change the disposition to DISP=(MOD,KEEP).

If FDRTSEL finds a LASTAPE data set name, it invokes special processing to keep track of the last tape used for output so that it can add files to that tape:

- at the *end* of processing, after all files have been written to the output tape, FDRTSEL will write a dummy (empty) file with the LASTAPE dsname as the last file on that output tape, and catalogs it for reference.
- at the *start* of processing, it does a LOCATE on the name to get the tape volume and file number from the catalog. It then uncatalogs the backup (in case of abend) and opens the file to verify that it is still on the tape. If the LOCATE or the OPEN fails, it assumes that the last tape is not usable and starts outputting to a fresh scratch tape.
- if the LASTAPE file is successfully opened, FDRTSEL will add new files to the tape. It will overwrite the LASTAPE file unless the TMS (tape management) option is specified on the CONTROL statement or is set in the FDR/ABR Global Options Table (ISPF panel A.I.4.4), in which case it starts just beyond the LASTAPE file.

If you change the DISP to (NEW,KEEP), it will uncatalog the LASTAPE file (if it exists) but will start outputting to a fresh scratch tape without trying to open the file, allowing you to specify when to add files to the LASTAPE and when to start fresh by simply changing the DISP. Alternately, you can uncatalog the LASTAPE file and the next FDRTSEL run using that name will use a scratch output.

**DISK TO DISK  
OPERATIONS**

When the TAPEOUT or TAPE2OUT DD statement points to a DISK volume, FDRTSEL will use this DD statement only to identify what volumes to use to receive the output files; data set name and other parameters on the DD are ignored. Internally, it will determine the available free space on all disk volumes identified by the TAPEOUT DD statement and will dynamically allocate a work DD statement with the disk volumes in the order of largest available free space. FDRTSEL recomputes the available free space and resets the order of the output volumes after each archive backup file is successfully copied (the NOPOOL operand on the CONTROL statement will override this sorting and use the volume in the order specified). [Section 10.16](#) has more information on the DD statement used with disk output.

If the output copy number (specified by ABRCOPY= or ABRCOPY2=) is different from input backup, FDRTSEL will simply COPY the requested backup files to the new output volumes. But if the output copy number is the same as the input, then FDRTSEL will copy the selected files to the new volsers with a copy number of "0". If the copy is successful, FDRTSEL will SCRATCH the input file from the disk volume, and then RENAME the "0" copy to the original copy number. The Archive Control File is updated appropriately.

Disk to Disk functions default to EXP=COPY to preserve the expiration date on disk. The input files selected by FDRTSEL for disk to disk must be cataloged and **you must not specify CAT=NO**. If CAT=NO is specified, this can cause the source TAPEIN file to be scratched and the file it was copied to will not be renamed properly.

Just like FDRABR pooldisk functions, FDRTSEL allows you to create a pool of volumes to be used in selection for the output of the disk to disk copy. You can define disk pools for the TAPEOUT dd statement by creating catalog entries pointing to the volsers or just allocated them via the JCL.

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## 10.22 CONTINUED . . .

**CHECKPOINT/RESTART** FDRTSEL includes an option to checkpoint all of its processing, and to restart if it is interrupted. This is useful for long FDRTSEL jobs to avoid repeating operations already completed.

If the optional TSELCKPT DD statement (described in the next section) is present, FDRTSEL will record on this data set:

- all control card information (all options and selection criteria)
- a list of all backups selected (to be processed)
- if ARCEDIT is used, a list of all data sets selected from within each backup
- a completion record for each backup successfully processed.

During initialization, if the TSELCKPT data set is empty or new, FDRTSEL assumes normal operation and initializes the data set with the information listed above. If FDRTSEL completes normally, it rewrites the checkpoint file as empty, ready for reuse by the next FDRTSEL execution.

But If FDRTSEL is stopped or shutdown before completion due toabend, MAXFILES, operator cancellation or the console commands described below, the checkpoint file contains all of the information to restart FDRTSEL after the last successfully copied file. When the FDRTSEL job is resubmitted, and the TSELCKPT DD points to the existing checkpoint file, FDRTSEL will detect that the file is NOT empty and will begin recovery processing automatically. It loads the selection criteria from the checkpoint file, ignoring the criteria in the jobstream, and processes the entire selection list again. Before copying a backup, FDRTSEL checks to see if there is a completion record in the checkpoint for that backup. If so, it displays the original completion date and time and bypasses the backup. Any backup not recorded as completed will be processed.

**OPERATOR COMMANDS** FDRTSEL has an operator communications function which allows you to STOP a currently running FDRTSEL job and display the STATUS of an FDRTSEL JOB.

You can direct FDRTSEL to terminate after completing processing on the current input file by issuing either the console MODIFY (F) or STOP (P) command, substituting the job name of the FDRTSEL job:

**F jobname,STOP**

**P jobname**

To request that FDRTSEL display on the console number of files selected for copying and the current file being copied, issue the MODIFY (F) command:

**F jobname,STATUS**

CONTINUED . . .

## 10.22 CONTINUED . . .

**CONSOLIDATING  
ARCHIVE  
TAPES**

An important function of FDRTSEL is the maintenance of your library of archived data on tape. Since archived data sets are usually kept for a long time, a year or more, the number of tape volumes devoted to archived data may become large. However, depending on how you create and managed your archived data, much of the data on those tapes may become obsolete, resulting in waste. This can occur if:

- you have data sets with varying expiration dates on the same tapes. This is especially likely if you use the SMSEXPIRE=YES function ([See Section 51](#)).
- you discard archived data sets which are no longer cataloged (such as GDGs).
- you don't keep the archived copies of data set after they have been recalled.

In these cases, you will want to periodically copy all or part of your archive library in order to discard the tape data that is no longer needed and consolidate the remainder onto a smaller set of tape volumes.

When you run FDRTSEL with SELECT ARCHIVE, it will select only those archive backup files which still have entries in the Archive Control File, so other backups on the input tapes will not be copied and the output tapes will contain less data.

SELECT ARCEDIT works much the same way, except that while copying the remaining backup files, the DASD data sets in those backups will be "edited" so that only those data sets which had entries selected from the Archive Control File will be copied; data sets which have been purged from the control file (or which were not selected) will be discarded, further reducing the size of those backup files which do remain.

The most straightforward way of consolidating archive tapes is to maintain your Archive Control File by periodically running the FDRARCH utility ([See Section 55.10](#)) with appropriate parameters to delete the entries for obsolete data sets, such as expired backups, restored data sets, uncataloged data sets, or whatever other options your installation's policy requires. Then run FDRTSEL to copy only the archive data for the data sets that remain in the control file. See the "Tape Consolidation" example in [Section 10.23](#).

**NOTE: FDRTSEL has no interface to tape management systems. Once FDRTSEL has created a replacement set of consolidated Archive backup tapes, it is your responsibility to expire the original tapes to free them up.**

**10.23 FDRTSEL ARCHIVE EXAMPLES****EXPIRED  
DISK-TO-TAPE**

Select the COPY 1 ARCHIVE backups on disk (COPY=1 BKDEVTYP=DISK) that have expired or will expire within 3 days (EXPIRE=YES XDAYS=3) and move them to tape. Copy the selected ARCHIVE backups creating 2 tape copies (COPY 1 and COPY 2) which will be retained for 2 years, then scratch the archive backup from disk. The CONTROL statement indicates that a maximum of 10 files will be created on COPY 1 (TAPEOUT) before requesting a new tape, but up to 255 files will be stacked on COPY 2 (TAPE2OUT) and a maximum of 50 archive backups will be copied in this run. The CONTROL statement can be omitted to remove these restrictions.

```
//FDRTSEL      EXEC   PGM=FDRTSEL, REGI ON=4M
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//ARCHI VE     DD     DI SP=SHR, DSN=FDRA BR. ARCHI VE
//TAPEOUT      DD     DI SP=(, KEEP), DSN=DUMMY1, UNI T=(TAPE, 2),
//              VOL=(, , 255), LABEL=RETPD=730
//TAPE2OUT     DD     DI SP=(, KEEP), DSN=DUMMY2, UNI T=(TAPE, 2),
//              VOL=(, , 255), LABEL=RETPD=730
//SYSI N       DD     *
MOVE          ABRCOPY2=2
SELECT        ARCHI VE, COPY=1, BKDEVTYP=DI SK, EXPI RE=YES, XDAYS=3
CONTROL       STACK=10, STACK2=YES, MAXFI LES=50
/*
```

**CREATE TAPE  
COPY OF DISK  
ARCHIVES**

Select the archive backups on disk (BKDEVTYP=DISK is the default) for which a second copy does not exist (IFONLYCOPY=1). Create a COPY 2 on tape with 1-year retention. This allows you to do archiving to disk only for quicker execution, and create the second copy on tape at a later time.

```
//FDRTSEL      EXEC   PGM=FDRTSEL, REGI ON=4M
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//ARCHI VE     DD     DI SP=SHR, DSN=FDRA BR. ARCHI VE
//TAPEOUT      DD     DI SP=(, KEEP), DSN=DUMMY1, UNI T=3490,
//              VOL=(, , 255), LABEL=RETPD=365
//SYSI N       DD     *
COPY          ABRCOPY=2
SELECT        ARCHI VE, I FONLYCOPY=1
/*
```

**UNRESTORED  
DISK-TO-TAPE**

Select the COPY 1 ARCHIVE backups on disk (BKDEVTYP=DISK is the default) created more than 60 days ago (PDAYS=60) and create a COPY 2 on tape, retaining only the archived DASD data sets which have not been recalled (ARCEDIT and RESTORED=NO). Archived data sets which have been removed from the Archive Control File by the FDRARCH utility will also be omitted from the copy.

```
//FDRTSEL      EXEC   PGM=FDRTSEL, REGI ON=4096K
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//ARCHI VE     DD     DI SP=SHR, DSN=FDRA BR. ARCHI VE
//TAPEOUT      DD     DI SP=(, KEEP), DSN=DUMMY1, UNI T=3480,
//              LABEL=RETPD=365
//SYSI N       DD     *
COPY          ABRCOPY=2
SELECT        ARCEDI T, COPY=1, RESTORED=NO, PDAYS=60
/*
```

CONTINUED . . .

## 10.23 CONTINUED . . .

**TAPE  
CONSOLI-  
DATION**

Select the COPY 1 ARCHIVE backups on tape for a full year (1995 in this example) and create new COPY 1 tapes, copying only the archived DASD data sets which are still recorded in the Archive Control File. Any tape files which no longer have any recorded data sets in the Control File will be completely dropped (not copied), while the use of ARCEDIT will insure that the copies of the remaining files will contain only the recorded data sets. This will result in a much smaller set of tapes. The original tapes will have to be manually expired in your tape management system. The use of the TSELCKPT data set allows the FDRTSEL job to be resubmitted and restarted if it fails or must be prematurely terminated (the second step deletes the checkpoint dataset only if the FDRTSEL step completes normally).

```
//FDRTSEL      EXEC   PGM=FDRTSEL, REGI ON=4M
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TSELCKPT     DD     DSN=TECH. FDRTSEL. CKPT, UNI T=DI SK, DI SP=(MOD, CATLG) ,
//              SPACE=(CYL, ( 2, 1) )
//TAPEOUT      DD     DI SP=(, KEEP) , DSN=DUMMY1, UNI T=3490,
//              LABEL=RETPD=365
//SYSI N       DD     *
COPY          DYNARC
SELECT        ARCEDI T, COPY=1, BKDEVTYP=TAPE,
              SDATE=95000, PDATE=96000
/*
//DELCKPT      EXEC   PGM=I EFBR14, COND=(O, NE, FDRTSEL)
//TSELCKPT     DD     DSN=TECH. FDRTSEL. CKPT, DI SP=(OLD, DELETE)
```

**REPORT ON  
ARCHIVE  
TAPES**

Generate a report of all of the COPY1 Archive backup tapes, to identify the tape volume serial, data set name, and file number for all archive files created before 1994. This might be used as a library pull list, to prepull the tape volumes required for a FDRTSEL COPY run. To execute the copy, omit the SIM operand and supply a TAPEOUT DD statement. Use of SIM to generate the pull list is highly recommended for large FDRTSEL runs unless the tapes are in an automated tape library

```
//SELLI ST     EXEC   PGM=FDRTSEL, REGI ON=4M
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//ARCHI VE     DD     DI SP=SHR, DSN=FDRA BR. ARCHI VE
//TAPEOUT      DD     DUMMY
//SYSI N       DD     *
COPY
SELECT        ARCHI VE, COPY=1, BKDEVTYP=TAPE, PDATE=94000
CONTROL      SI M
/*
```

CONTINUED . . .



## 10.23 CONTINUED . . .

**MOVE  
ARCHIVES TO  
NEW DISKS**

Select the archive backups on 3380 disk volume ARCH01 and move them to a new pool of two 3390 disk volumes ABR100 and ABR200. This job will allocate the files on the new volsers with the appropriate size, copy the files from ARCH01, update the Archive Control File appropriately, and scratch the input files on ARCH01 .

```
//FDRTSEL      EXEC   PGM=FDRTSEL, REGI ON=4M
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//ARCHI VE     DD     DI SP=SHR, DSN=FDRABR. ARCHI VE
//TAPEOUT      DD     UNI T=3390, VOL=SER=( ABR100, ABR200) , DI SP=OLD
//SYSI N       DD     *
COPY
SELECT        ARCHI VE, COPY=1, BKVOL=( ARCH01)
/*
```

**REDUCE THE  
SIZE OF DISK  
ARCHIVES**

Select the archive backups on disk older than 30 days and copy them to new files in the same disk pool. Use the ARCEDIT feature to drop all data sets that are marked as RESTORED; this will also drop all archived data sets which are no longer in the Archive Control File. It may result in considerably smaller archive files on disk.

```
//FDRTSEL      EXEC   PGM=FDRTSEL, REGI ON=4M
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TAPEOUT      DD     UNI T=3390, VOL=SER=( ARCO01, ARCO02) , DI SP=OLD
//SYSI N       DD     *
COPY          DYNARC
SELECT        ARCEDI T, COPY=1, RESTORED=NO, PDAYS=30
/*
```

**COPY  
APPLICATION  
BACKUP**

A backup tape created with Application Backup (DUMP TYPE=APPL) can be copied with FDRTSEL as long as the Control File in which the backup is recorded is still on disk. Application Backup, described in [Section 51](#), usually involves putting a DSF backup of the Control File which describes the backups on the tape, at the end of the tape, but the most recent copy of the Control File is usually still on disk. FDRTSEL can update the disk Control File and put a fresh backup of it at the end of the output tape created. In this example, a COPY 2 backup is created from all of the COPY 1 payroll backups recorded in the Control File pointed to by the ARCHIVE DD statement. A DSF backup of the Control File will be created as the last file on the tape using GDG name "PAYROLL.CONTROL.BACKUP2"

```
//COPYSEL      EXEC   PGM=FDRTSEL
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//ARCHI VE     DD     DSN=PAYROLL. ARCHI VE. DAI LY(O) , DI SP=OLD
//TAPEOUT      DD     DSN=PAYROLL. APPL. BACKUP2, DI SP=( NEW, KEEP) ,
//              UNI T=3490, LABEL=( 1, SL)
//SYSI N       DD     *
SELECT        ARCHI VE, COPY=1, BKDEV TYP=TAPE
COPY          COPYDSN=YES, ABRCOPY=FLI P,
              ABRI NDEX=PAYROLL
CONTROL      ARCBACKUP=DSF, ARCB1DSN=PAYROLL. CONTROL. BACKUP2(+1)
/*
```

## 10.24 FDRTSEL BACKUP EXAMPLES

**CONSOLIDATE  
BACKUPS**

Although ABR normally stacks backups as multiple files on tape, backups may be spread across tape volumes depending on the setup of your backups. This example shows how to make a COPY 2 of all COPY 1 ABR backups for disk volumes beginning with PROD, SYS, and IPLRES, stacking the backups on as few cartridges as possible. Software compression is used even if the original backups are not compressed (COMPRESS=ALL). By default, all backups in the current generation of the selected volumes will be included in the copy (most recent full-volume backup and all succeeding incremental backups).

```
//FDRTSEL    EXEC    PGM=FDRTSEL, REGI ON=2048K
//SYSPRI NT   DD      SYSOUT= *
//SYSUDUMP    DD      SYSOUT= *
//TAPEOUT     DD      DI SP=( , KEEP) , DSN=DUMMY1, UNI T=3480,
//              LABEL=EXPDT=99000, VOL=( , , 255)
//SYSI N      DD      *
COPY          COMPRESS=ALL
SELECT        CATLG, SOURCE=1, COPY=2,
              VOL=( PROD*, SYS*, I PLRES)
/*
```

**INCREMENTAL  
BACKUPS  
DISK-TO-TAPE**

Some installations do daily ABR incremental backups to disk, perhaps because operators are not available to mount tapes during the night. Later, FDRTSEL can be used to move those backups to tape. This example selects all incremental backups (TYPE=ABR) in the current generation for all DASD volumes whose COPY 1 backup is on disk (BKDEVTYP=DISK), and creates a COPY 2 on TAPEOUT and a replacement COPY 1 on TAPE2OUT (ABRCOPY2=1), scratching the backups on disk.

```
//FDRTSEL    EXEC    PGM=FDRTSEL, REGI ON=2048K
//SYSUDUMP    DD      SYSOUT= *
//SYSPRI NT   DD      SYSOUT= *
//TAPEOUT     DD      DI SP=( , KEEP) , DSN=DUMMY1, UNI T=( CART, 2) ,
//              LABEL=RETPD=14, VOL=( , , 255)
//TAPE2OUT    DD      DI SP=( , KEEP) , DSN=DUMMY2, UNI T=( CART, 2) ,
//              LABEL=RETPD=14, VOL=( , , 255)
//SYSI N      DD      *
MOVE          ABRCOPY2=1
SELECT        CATLG, TYPE=ABR, BKDEVTYP=DI SK
/*
```

CONTINUED . . .

## 10.24 CONTINUED . . .

**CREATE COPY 2** If you create only COPY 1 backups with ABR (to reduce your run time or your tape drive requirements), you can use FDRTSEL to create the second backup asynchronously once the backups complete. IFNOCOPY=2 directs FDRTSEL to copy only those COPY 1 backups for which no COPY 2 already exists. CYCLES=14 indicates that the most recent 14 backups for every DASD volume should be examined for missing COPY 2 backups; this insures that even if the FDRTSEL job is not run or does not complete for a number of days, it will still create all the required COPY 2 backups. The COPY 2 backups will receive the same expiration dates as the equivalent COPY 1s.

```
//FDRTSEL      EXEC  PGM=FDRTSEL, REGI ON=4M
//SYSPRI NT    DD    SYSOUT=*
//SYSUDUMP     DD    SYSOUT=*
//TAPEOUT      DD    DI SP=( , KEEP) , DSN=DUMMY1, UNI T=( 3480, 2) ,
//              DD    VOL=( , , 255)
//SYSI N       DD    *
COPY
SELECT        CATLG, SOURCE=1, I FNOCOPY=2, CYCLES=14
/*
```

**STACK BACKUP GENERATION** At some installations, volumes with little or low activity do not receive weekly full-volume backups, substituting daily incrementals over a long period. However, a full-volume restore of a disk with many incrementals may require excessive tape mounts. To reduce recovery time, you can use FDRTSEL periodically to combine these incremental backups to one tape. This example will copy all the COPY 1 backups in the current generation of volumes starting with LIB and create replacement COPY 1 backups with all backups for a given DASD volume stacked on one tape set. Recovery time is greatly enhanced because the files are stacked on the tape in the order in which they are required for a full-volume restore. Expiration dates of the original backups will be copied to the output tapes.

```
//FDRTSEL      EXEC  PGM=FDRTSEL, REGI ON=4M
//SYSUDUMP     DD    SYSOUT=*
//SYSPRI NT    DD    SYSOUT=*
//TAPEOUT      DD    DI SP=( , KEEP) , DSN=DUMMY1, UNI T=( 3480, 2) ,
//              DD    VOL=( , , 255)
//SYSI N       DD    *
COPY
SELECT        CATLG, SOURCE=1, COPY=1, VOL=LI B*
CONTROL       STACK=VOLUME
/*
```

**DISASTER RECOVERY COPY 1** Select all backups in the current generation for all DASD volumes and create a COPY 3 to be shipped off site for disaster recovery. For enhanced restore speed, all backups (full and incremental) for a given DASD volume are stacked on a separate tape set (STACK=VOLUME). FDRTSEL automatically writes the backups on the tapes in the order in which they are needed for a restore. Note that this may require repeated mounting of the input tapes and may take considerable time to complete (see next example).

```
//FDRTSEL      EXEC  PGM=FDRTSEL, REGI ON=4M
//SYSPRI NT    DD    SYSOUT=*
//SYSUDUMP     DD    SYSOUT=*
//TAPEOUT      DD    DI SP=( , KEEP) , DSN=DUMMY1, UNI T=( 3490, 2) ,
//              DD    LABEL=RETPD=35, VOL=( , , 255)
//SYSI N       DD    *
COPY
SELECT        CATLG, SOURCE=1, COPY=3
CONTROL       STACK=VOLUME
/*
```

CONTINUED . . .

## 10.24 CONTINUED . . .

**DISASTER  
RECOVERY  
COPY II**

If you have a large number of backups to copy, you can reduce the elapsed time by breaking the copy into multiple jobs which run concurrently. Each job copies a set of DASD volumes by volser prefix. In this example, COPY 2 is used as the input to create the COPY 3 for offsite storage (perhaps because it is stored in a robotic tape library). UNIT=2 requests that 2 tape drives be used for mounting input tapes, which will reduce elapsed time when copying full-volume backups.

```
//TSELOO1      JOB      . . . . .
//FDRTSEL      EXEC     PGM=FDRTSEL, REGI ON=4M
//SYSUDUMP     DD       SYSOUT=*
//SYSPRI NT    DD       SYSOUT=*
//TAPEOUT      DD       DI SP=( , KEEP) , DSN=DUMMY1, UNI T=( 3490, 2) ,
//              LABEL=EXPDT=99000, VOL=( , , 255)
//SYSI N       DD       *
COPY
  SELECT       CATLG, SOURCE=2, COPY=3, VOL=I MS*
  CONTROL      STACK=VOLUME, UNI T=2
/*
//TSELOO2      JOB      . . . . .
//FDRTSEL      EXEC     PGM=FDRTSEL, REGI ON=4M
//SYSUDUMP     DD       SYSOUT=*
//SYSPRI NT    DD       SYSOUT=*
//TAPEOUT      DD       DI SP=( , KEEP) , DSN=DUMMY2, UNI T=( 3480, 2) ,
//              LABEL=EXPDT=99000, VOL=( , , 255)
//SYSI N       DD       *
COPY
  SELECT       CATLG, SOURCE=2, COPY=3, VOL=( CI CS*, ONL*)
  CONTROL      STACK=VOLUME, UNI T=2
/*
```

## 10.25 INTRODUCTION AND JOB CONTROL REQUIREMENT

The FDR/ABR statistics query program (FDRQUERY) has been specifically designed to produce DUMP statistics as if a user were backing up disk volumes with FDR or with FDRABR using TYPE=ABR. Also the user can request how many data sets would be archived by FDRABR using last reference date groupings. Note that FDRQUERY is dependent on the MVS/SU60 data set changed indicator set in the Format 1 (F1) DSCB when a data set is opened for other than input.

**BACKUP  
SIMULATION**

The FDR statistics query program will scan all of the volumes specified comparing the number of tracks which would be dumped if FDR were to execute against the volume as compared to ABR dumping only data sets which have the update indicator. The saving is printed in tracks and percentage. Since ABR is usually run every day, the query program will not report on any data set with an update indicator if it has not been referenced in the last two days. Even using this technique, the query program may indicate that a larger number of data sets will be dumped by ABR than would actually take place, if the update indicator is on but the data set was only read in the last two days.

**ARCHIVE  
SIMULATION**

The FDR statistics query program can scan all of the volumes specified to report on the number of data sets and the tracks they occupy, grouped by the last time they were referenced. As a default the query program will report data sets in 30 day groups. The purpose of this report is to show an FDR user how much disk space could be saved, if ABR were used to archive off data sets which have not been referenced in a specific period of time.

**SUMMARY LEVEL -- VOLUME SERIAL NUMBER****SAMPLE  
ARCHIVE  
REPORT**

<u>VOLSER</u>	<u>DEVTYPE</u>	<u>ALLOC TRACKS</u>	<u>BEFORE %ALLOC</u>	<u>AFTER %ALLOC</u>	<u>LAST USED</u>		<u>SAVINGS IF ARCHIVED</u>		
					<u>DAYS</u>	<u>DATE</u>	<u>DSNS</u>	<u>TRACKS</u>	<u>%SAVED</u>
PROD32	3380-K	17013	42.71%	32.08%	30	88051	12	4237	24.90%

The report fields are:

**ALLOC TRACKS** -- This number represents the total currently allocated tracks.

**BEFORE % ALLOC** -- This number is the percentage of the volume that is in use. It is the number of tracks allocated, divided by the total number of tracks on the disk. For example, volume PROD32 (a 3380-K DASD) contains 39,825 tracks of which 17,013 tracks are allocated. The BEFORE % ALLOC is 42.71% ( $17,013 \div 39,825 = 42.71\%$ ).

**AFTER % ALLOC** -- This field represents the percent allocated the volume will be if you archive data sets that have not been used for the number of days specified in the next column. For example, if on PROD32, there are 12 data sets with 4237 tracks that have not been referenced in 30 days and you archive them, the AFTER % ALLOC will be 32.08%.

$$\begin{array}{ccccccc}
 17,013 & - & 4237 & = & 12,776 & \div & 39,825 & = & 32.08\% \\
 \text{Allocated} & & \text{Archived} & & \text{Tracks} & & \text{Number} & & \text{After \%} \\
 \text{Tracks} & & \text{Tracks} & & \text{after} & & \text{of} & & \text{ALLOC} \\
 & & & & \text{Archiving} & & \text{Tracks} & & 
 \end{array}$$

**LAST USED** -- The DAYS field shows the number of days used to calculate this line in the report. The data sets on this line have not been used for this number of days. The DATE field shows the corresponding Julian date (today's date minus DAYS).

**SAVINGS IF ARCHIVED** -- These fields show the number of data sets which would be archived, the number of tracks allocated to those data sets and the percentage of the total allocated tracks they represent.

For example, if volume PROD32 has 17,013 tracks allocated and you archive 4237 tracks, the % SAVED will be 24.90% ( $4237 \div 17,013 = 24.90\%$ ). This means that 24.90% of the allocated space would be freed by ARCHIVING.

CONTINUED . . .

**10.25 JOB CONTROL REQUIREMENTS**

<b>JOB STATEMENT</b>	The JOB Statement is user-specified and depends upon installation standards.
<b>EXEC STATEMENT</b>	Must specify the name of the FDR/ABR DUMP statistics query program (FDRQUERY). The EXEC statement may also contain a region requirement of 512K.
<b>STEPLIB or JOBLIB DD STATEMENT</b>	If required, must specify the load module library in which FDRQUERY resides. It is recommended that this be an APF AUTHORIZED Library and that FDRQUERY be linked with an authorization code of one (1) so that operands that require authorization may be used.
<b>SYSPRINT DD STATEMENT</b>	Specifies the primary output message data set. This is a required DD statement and is usually a SYSOUT data set.
<b>SYSIN DD STATEMENT</b>	Specifies the control statement data set. Usually an input stream or DD * data set.

**10.26 FDR/ABR STATISTICS QUERY**

**REPORT SUB-COMMAND** The REPORT Subcommand is used to print total tracks and data sets by disk volume and device, simulating the FDR/FDRDSF/FDRABR DUMP and ARCHIVE Commands.

FDRQUERY will default to scanning all of the disk volumes which are currently online (unless overridden by VOL(G), STORGRP, or UNITNAME). The report will be formatted for an 80 byte terminal screen.

<b>REPORT STATEMENT</b>	<b>REPORT</b>	<b>ARCHIVE BACKUP</b>	<b>,MAXONLINE=nnnn</b>
			<b>,ONLINE</b>
		<b>,AGE=nnn</b>	<b>,STORGRP=cccccccc</b>
		<b>,AGEINC=nnn</b>	<b>,UNITNAME=cccccccc</b>
		<b>,LINECNT=nn</b>	<b>,VOL=vvvvvv VOLG=vvvvv</b>
		<b>,LRDAYS=nnn</b>	
<b>OPERANDS</b>	<b>ARCHIVE</b>	FDR will summarize Archive statistics by disk volume, indicating the number of data sets and tracks that would be freed up if FDRABR archive was executed against these volumes. The data sets are grouped by last reference date.  The default is 30 day groups.	
	<b>BACKUP</b>	Print summarized DUMP statistics by disk volume and device type, indicating the number of tracks and data sets that would be dumped by FDR and comparing the results to FDRABR dumping only the data sets which have been updated. The used portion of a data set (partitioned or sequential) is the number of tracks encompassed by the Last Block Pointer (DS1LSTAR). Data sets are considered to be 'UPDATED' if the MVS/SU60 indicator (x '02' on at DSCB offset 93(5D)) is present and the data set has been referenced in the last n days.  Default is 2 days (See LRDAYS).  NOTE: The 'BACKUP' operand conflicts with the operand 'ARCHIVE'. Either the operand BACKUP or ARCHIVE must be specified.	
	<b>AGE=</b>	Specifies the starting number of days since a data set has been referenced as used by the AGING summary in the archive simulation. The number may be from 1 to 999 inclusive.  Default is 30.	
	<b>AGEINC=</b>	Specifies the number to be added to the age value to derive the next date control break in the AGING summary in the archive simulation. The number may be from 1 to 999 inclusive.  Default is 30.  NOTE: AGE and AGEINC operands are ignored if 'BACKUP' is specified.	

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## 10.26 CONTINUED . . .

- LINECNT=** Specifies the maximum number of lines to be printed on any report page. The number may be from 28 to 99 inclusive.  
Default is 58.
- LRDAYS=** BACKUP only. Specifies the number of days that a data set must have been referenced for the update indicator to be considered for the ABR portion of the report. May specify from 0 to 999 days, with zero meaning today.  
Default is 1, the data set must have been referenced in the last two days.
- MAXONLINE=** Specifies the maximum number of disk volumes that may be allocated via DD statements and/or by dynamic allocation during any single program execution. The number may be from 5 to 9000 inclusive.  
The default is 256.
- ONLINE** ONLINE specifies that the query program is to use all available ONLINE DASD devices to satisfy the user-specified selection criteria.  
Default is ONLINE. The selection will be satisfied using ALL ONLINE VOLUMES unless the user specified 'VOL', 'VOLG', STORGRP and/or UNITNAME.
- STORGRP=** Specifies the volume serial numbers to be summarized must be part of the Systems Managed Storage (SMS) storage group name specified.  
Default is deferred to the VOLG operand.
- UNITNAME=** Specifies the volume serial numbers to be summarized must be mounted on a unit address found in the esoteric or generic unit name specified.  
NOTE: Selection by UNITNAME requires that FDRQUERY be installed in an authorized library with an authorization code of one (1). If UNITNAME selection is attempted and FDRQUERY is not authorized, an FDR640 message will be issued and the request bypassed.  
Default is deferred to the VOLG operand.
- VOL=** Specifies the disk volume serial number to be summarized. This is an exact match operand (i.e.: compare length is 6). Only those disk volume serial numbers that match exactly will be considered. Multiple volume serial numbers may be specified if entered=(v...v,...,v...v).  
Default is deferred to the VOLG operand.
- VOLG=** Specifies the prefix of the disk volume to be summarized. Only those disk volume serial numbers that start with the prefix specified will be considered. Multiple volume groups may be specified if entered=(v...v,...,v...v). Up to 400 volume groups (or individual disk volumes) can be specified on each REPORT command.  
Default, if NONE of the volume selection criteria (STORGRP, UNITNAME, VOL, VOLG) is specified, is to select data from all accessible disk volumes.



**10.27 FDRQUERY EXAMPLES**

These examples illustrate some of the FDRQUERY options. JOB and JOBLIB/STEPLIB DD statements are not shown and if required must specify the load module library in which FDRQUERY resides.

**EXAMPLE 1** Print DUMP and ARCHIVE statistics for all ONLINE disk.

```
//STEP1      EXEC   PGM=FDRQUERY
//SYSPRI NT   DD     SYSOUT=A
//SYSI N      DD     *
REPORT       BACKUP
REPORT       ARCHI VE
```

**EXAMPLE 2** Print comparison DUMP statistics for specific disk volumes.

```
//STEP1      EXEC   PGM=FDRQUERY
//SYSPRI NT   DD     SYSOUT=A
//SYSI N      DD     *
REPORT       BACKUP, VOL=( PRODPK, LI B501, TEST01)
```

**EXAMPLE 3** Print ARCHIVE statistics for all ONLINE disk volumes starting with the prefix 'PROD'. Increment the ADAYS/ADATE range by 15 days.

```
//STEP1      EXEC   PGM=FDRQUERY
//SYSPRI NT   DD     SYSOUT=A
//SYSI N      DD     *
REPORT       ARCHI VE, VOLG=PROD, AGEI NC=15
```

**EXAMPLE 4** Print ARCHIVE statistics for all disk volumes within the SMS storage group TSOTEST. Set the minimum number of days since last referenced to 60.

```
//STEP1      EXEC   PGM=FDRQUERY
//SYSPRI NT   DD     SYSOUT=A
//SYSI N      DD     *
REPORT       ARCHI VE, AGE=60, STORGRP=TSOTEST
```

**EXAMPLE 5** Print comparison DUMP statistics for all disk volumes within the esoteric unit named DISK.

NOTE: UNITNAME selection requires APF authorization.

```
//STEP1      EXEC   PGM=FDRQUERY
//SYSPRI NT   DD     SYSOUT=A
//SYSI N      DD     *
REPORT       BACKUP, UNI TNAME=DI SK
```

**EXAMPLE 6** Report to a TSO terminal the archiving or DUMP statistics for all online volumes. The report will be formatted for an 80 byte screen. The SYSIN and SYSPRINT data sets must be allocated to the terminal prior to the CALL (EXAMPLE: ALLOCATE DD(SYSIN) DA(\*) ).

```
CALL      ' FDR l i b r a r y   n a m e   ( F D R Q U E R Y ) '           " PRESS"  " ENTER"
FDRQUERY- - ENTER COMMAND OR END
REPORT BACKUP                                                         " PRESS"  " ENTER"
                                                                OR
REPORT ARCHI VE                                                         " PRESS"  " ENTER"
```

*These commands will report on all online volumes. Use VOL= or VOLG= to limit selection criteria (i.e. REPORT ARCHIVE,VOLG=TSO)*

## 10.28 FDRQUERY SUMMARY ILLUSTRATION

## FDRQUERY INCREMENTAL BACKUP SAVINGS

VOLSER	DEVTYPE	TRACKS	ALLOCATED			INCREMENTAL			SAVINGS		
			TRACKS	DSNS	PER	TRACKS	DSNS	PER	TRACKS	DSNS	PER
MVSYS1	3380	13275	7359	124	56%	3947	91	30%	3412	33	46%
MVSYS2	3380	13275	11223	97	85%	1634	18	12%	9586	79	86%
TSO001	3350	16650	16125	968	96%	4015	29	24%	12110	939	75%
TSO002	3350	16650	15500	812	93%	3900	150	23%	11600	662	74%

*Tape and elapsed time savings over full volume dump*

## FDRQUERY INCREMENTAL BACKUP SAVINGS

VOLSER	DEVTYPE	TRACKS	ALLOCATED			INCREMENTAL			SAVINGS		
			TRACKS	DSNS	PER	TRACKS	DSNS	PER	TRACKS	DSNS	PER
TOTAL	3350	33300	31625	1780	95%	7915	179	24%	23710	1601	75%
TOTAL	3380	26550	18582	221	70%	5581	109	21%	13001	12	70%

## ABR's Incremental Backup &amp; Recovery

ABR automates the backup of disk volumes. Data sets are automatically backed up when updated. ABR incrementals can save you 50-80% of your backup time compared to DFHSM.

**Data Set Restore** – ABR can automatically recover data set(s) from the most current or older backups. Entire disk volumes can be recreated as if a full volume backup was taken the prior night.

## FDRQUERY SPACE MANAGEMENT SAVINGS

VOLSER	DEVTYPE	ALLOC TRACKS	BEFORE %ALLOC	AFTER %ALLOC	LAST USED		SAVINGS IF ARCHIVED		
					DAYS	DATE	DSNS	TRACKS	%SAVED
TSO002	3380-K	36045	90.51%	43.19%	30	89051	6901	18841	52.27%
				54.94%	60	89021	4787	14162	39.29%
				63.71%	90	88356	2962	10672	29.61%
				68.58%	120	88326	1897	8730	24.22%

PROD32	3380-K	27479	69.00%	49.01%	30	89051	51	7959	40.78%
				32.08%	60	89021	12	4237	24.90%

*Space occupied by data sets inactive for 30 days.*

## SUMMARY LEVEL BY DEVICE TYPE

VOLSER	DEVTYPE	ALLOC TRACKS	BEFORE %ALLOC	AFTER %ALLOC	LAST USED		SAVINGS IF ARCHIVED		
					DAYS	DATE	DSNS	TRACKS	%SAVED
6	3380-K	173095	72.44%	52.66%	30	89051	9423	47264	27.30%
				55.81%	60	89021	5296	39722	22.94%
				60.48%	90	88356	4199	28558	16.49%
				64.94%	120	88326	2972	17911	10.34%

## ABR's Archive &amp; Auto Recall

**Multi-Level Archive** – ABR can simultaneously archive data set(s) to disk and tape. The data is stored in backup format, which generally requires significantly less space on disk than originally used. The data is retained on disk for a short

user-specified time period, and is then automatically deleted by ABR, leaving the tape copy for a longer retention period.

**Auto Recall** – ABR will automatically recall ARCHIVED data sets when they are referenced by a TSO or BATCH user.

# FDRDSF FDRCOPY FDRRREORG<sup>®</sup>

USER DOCUMENTATION

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**OVERVIEW** DATA SET FUNCTIONS (DSF) is the component of the FDR DASD MANAGEMENT SYSTEM that backs up and restores data sets. DSF can be executed directly (as PGM=FDRDSF) and is also used internally for all data set-level operations in FDRABR (See Sections 50 and 51).

A DSF backup creates a sequential file containing an image of all of the data sets which were backed up from one disk volume. An unlimited number of data sets may be dumped from up to 39 disk volumes in one execution of FDRDSF. DSF can dump or restore ranges of tracks, using the absolute track function. DSF can backup the data sets to tape or to a disk as a sequential file. Data sets backed up by FDRDSF can be restored by FDRDSF or FDRABR.

DSF can restore data sets from up to 39 separate backup files back to disk in one execution of FDRDSF. Data sets being restored from one backup file may be written to multiple output disks concurrently. DSF will pre-allocate and catalog the output data set if it does not currently exist on the disk volume. DSF can restore entire data sets or specified ranges of physical tracks from data set backup files created by FDRDSF, FDRABR, or SAR, or from full-volume backups created by FDR, FDRABR or SAR.

DSF can print data sets or individual tracks from a disk volume.

LOWCHART

```
graph TD; DSF["DSF  
(DATA SET FUNCTION)"] --> Backup["DATA SET  
BACKUP"]; DSF --> Restore["DATA SET  
RESTORE"]; DSF --> Absolute["ABSOLUTE  
TRACK  
OPERATION"]; DSF --> Print["PRINT  
OPERATION"]; DSF --> VSAM["VSAM IN  
ICF CATALOG  
SUPPORT"]; DSF --> Performance["PERFORMANCE  
OPTION"]; DSF --> Enqueue["DATA SET  
ENQUEUE  
OPTION"]; Enqueue --> Test["TEST"]; Enqueue --> Lockup["LOCKUP"]; Enqueue --> MustHave["MUST HAVE"];
```

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## 20.01 CONTINUED . . .

**WHAT DSF  
DUMPS**

In a data set DUMP operation, DSF dumps from disk to the sequential backup data set images of all the required tracks of the selected data sets. DSF also records all DSCB information associated with the data sets dumped. The data sets to be dumped can be selected by fully-qualified name or using generic data set selection, or all the data sets on a volume can be dumped. The VTOC and volume label track may also be dumped. DSF differs from FDR when dumping PS or PO data sets. As the default DSF will dump only up to the last block pointer (end-of-file) on these data sets (DATA=USED), while FDR's default is to dump the entire allocated space of all data sets (DATA=ALL).

Like FDR, DSF writes all data selected from one input disk volume to one output file on tape or disk. Data from multiple disk volumes cannot be combined in one DSF backup data set.

**WHAT DSF  
RESTORES**

In a data set RESTORE operation, DSF restores the requested data sets from backup files created by DSF, ABR, SAR, or FDR, back to a disk volume.

If restoring to the same disk type that the data set was dumped from (a "like" restore), the data sets are restored in their original format. Every restored track will contain the exact contents of the equivalent original track. This is called a "physical" restore.

If restoring to a different disk type (an "unlike" restore), DSF will reformat the data sets so that the data will fit on the new device type. This "logical" restore is also used when reblocking data sets on like devices.

FDRCOPY will search the VTOC of the selected output volume to see whether the output data set name already exists there. If so, FDRCOPY will overlay the existing data set (unless the PRESTAGE operand is specified). If not, FDRCOPY will allocate space for the output data set.

If FDRCOPY allocates the data set, it will allocate the same amount of space that is allocated to the input data set, unless the operands RLSE or %FREE= request a smaller amount, or the CYL= or TRK= operands request a larger amount. Unless the data set is marked as unmovable (e.g. DSORG is PSU), it may be allocated anywhere on the output volume.

If the data set exists on the output volume before the copy or move, FDRCOPY will overlay the existing data. For VSAM clusters, each component of the output cluster must be as large or larger than the equivalent input component. For non-VSAM, if the output data set is too small, FDRCOPY will allocate an additional extent of the required size, if possible.

For PS (sequential) and PO (partitioned) data sets, DSF will only restore tracks up to the last block pointer (used tracks) unless DATA=ALL is specified.

Data sets can be restored to new names, different from the original data set names which were dumped.

DSF fills in the Format 1 and 2 DSCBs on the disk with the information it recorded when the data set was backed up. [See Section 52.04](#) (What DSF Restores in the DSCB) for details.

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## 20.01 CONTINUED . . .

**CATALOGING  
NON-VSAM  
OUTPUT  
DATA SETS**

For single-volume non-VSAM data sets:

If DSF allocates space for the output data set, then the default is that DSF will catalog the data set to the output volume, unless the data set was already cataloged. If the RECAT operand is specified, it will catalog the data set to the output volume, whether the data set was cataloged to the input volume before the operation, or cataloged elsewhere, or not cataloged at all.

If the NOCAT operand is specified then DSF will not catalog the output data set.

Cataloging or recataloging of non-VSAM data sets occurs at the end of the RESTORE, and is bypassed if any errors have occurred for a given data set.

If the output data set exists on disk before the restore, then DSF will not update the catalog, unless the CATIFALLOC operand is specified.

STEPCAT is supported; if present, only the STEPCAT catalog (or the first catalog in the STEPCAT concatenation) will be searched and updated.

**NOTE: If a DSF restore is interrupted by an ABEND or system crash, then the output data sets will be left on disk, but will not be cataloged. When the run is resubmitted, CATIFALLOC must be specified if the output data sets are to be cataloged.**

For multi-volume non-VSAM data sets, the above rules for single-volume data sets apply, with the following modifications:

If the data set is not already cataloged DSF will create a new multi-volume catalog entry with the current output volume in the proper slot as indicated by the volume sequence number in the DSCB. If the volume sequence number is higher than 1, FDRCOPY will fill in the preceding slots in the catalog entry with a dummy volume serial of "####nn".

If the data set is already cataloged DSF will update the catalog entry by putting the current output volume into the proper slot as indicated by the volume sequence number in the DSCB. On a RESTORE without RECAT, DSF will update the catalog entry only if the slot for this output volume contains the dummy volume serial of "####nn"; otherwise a warning message will be issued.

Thus, when doing a RESTORE with RECAT of a cataloged multi-volume data set to the same name, the resulting data set and catalog entry will be usable and correct, whether the data set is restored to one, some, or all of its original volumes. When doing a RESTORE of a multi-volume data set to a new name, it will be necessary to restore the data set from all of its backups to get a usable data set and catalog entry. Multi-volume data sets must be restored to as many unique volumes as they were dumped from. If a multi-volume data set is being restored to a new device type, it will not be usable until all pieces are on the same device type.

**ABSOLUTE  
TRACK  
ADDRESS  
OPTION**

DSF will DUMP physical segments of a disk pack to tape by physical track starting and ending addresses.

DSF will RESTORE physical segments of a disk pack from a tape created by DSF, ABR, SAR or FDR. The RESTORE process will place the tracks identified by track starting and ending addresses in precisely the same physical location as they occupied when dumped. No update to the disk VTOC takes place when ABSOLUTE TRACK ADDRESS operations are used. The restore must be to a "like" disk type.

**DSF PRINT  
OPTION**

DSF provides an option to print tracks by fully-qualified data set name, by absolute track address, or by using generic data set name selection. For each track selected, DSF will print the record zero plus each physical record on the track. The count field, key (if any) and data are printed in storage dump format (hexadecimal plus EBCDIC).

**ICF VSAM  
SUPPORT**

DSF supports ICF VSAM files using the base cluster name as the data set name. When a cluster is selected, DSF will DUMP/RESTORE all of the components associated with the cluster on a volume, including alternate indexes. In addition DSF will DUMP or RESTORE the VVR records found in the 'SYS1.VVDS' data set; since those VVRs contain all of the characteristics and statistics about each component, they provide DSF with information to allocate and restore clusters. Since FDR and FDRABR also backup the VVR information, DSF can restore ICF clusters from any backup created by FDR, FDRDSF, or FDRABR (but not SAR). ICF VSAM clusters may be selected by fully-qualified cluster name or using generic data set selection. ICF VSAM components cannot be selected by individual component name, only by cluster name.

[See Section 52.11](#) for VSAM Special Considerations.

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**20.01 CONTINUED . . .****CONTROL STATEMENTS**

DSF is controlled by a primary DUMP, RESTORE, or PRINT control statement specifying the function to be performed in this execution with keywords specifying various execution options, followed by SELECT and EXCLUDE statements to specify the data sets to be processed.

DSF will process up to 250 SELECT/EXCLUDE statements in a single execution (a keyword MAXCARDS= is provided to increase this limit). Each SELECT/EXCLUDE can specify one data set or a group of data sets.

A facility to reference a Generation Data Group (GDG) data set by its relative Generation Number is provided. This facility also allows reference to non-standard Data Set Names.

**DIAGNOSTIC PROCESSING**

DSF uses the same physical disk access technique as FDR. DSF continually analyzes its processing as does FDR.

DSF reports any discrepancies it detects in the VTOC or on the disk itself. Errors detected in a VTOC may preclude the use of DSF data set operations. DSF depends on the disk VTOC to establish the characteristics of the data set(s); for this reason DSF attempts to determine the integrity of the VTOC before it begins DUMP/RESTORE processing.

Warning messages are always provided by DSF during any ABSOLUTE TRACK OPERATION RESTORE in which data is written within the VTOC or volume label of the receiving disk pack.

DSF always indicates the successful completion of a DUMP/RESTORE with an FDR999 message and a list of the data sets it processed.

**ALTERNATE DEVICE SUPPORT**

DSF can restore data sets to a new device type.

A restore to different models of the same device type is a "like" device (physical) restore, treated the same as a restore to the original device and model, as long as the output volume has sufficient space to hold the data sets being restored. For example, a data set backed up from any 3380 can be restored to any 3380 single, double (3380-E) or triple (3380-K) density disk, or any 3390 in 3380 compatibility mode; any 3390 native mode data set can be restored to a single (3390-1), double (3390-2) density disk or triple (3390-3) density disk. Migration can be from a backup created by FDR, DSF, SAR or ABR, on tape or disk.

DSF can also restore data sets that were backed up from one device type to a totally different type of disk (an "unlike" device) using a logical restore. For example, data sets can be restored from a backup of a 3380 (any model) to a 3390 (any model). Data sets can be restored from one backup file to both like and unlike devices concurrently. The logical restore occurs automatically when DSF detects the different device type or when reblocking is requested. The logical restore is from the normal FDR/DSF/ABR/SAR physical backup tape; no special logical dump is required.

Logical restore supports most data set organizations (DSORGs) including PS (physical sequential), PO (partitioned), DA (direct), KSDS (ICF VSAM keyed), ESDS (ICF VSAM sequential), RRDS (ICF VSAM relative record), and LDS (ICF VSAM linear). When allocating data sets on an unlike device, DSF will allocate an amount of space roughly equivalent to the size of the input data set in bytes. If this proves to be too small, DSF will attempt to extend the data set if it is non-VSAM. Pre-allocated data sets must be allocated with this same space.

Details on how physical and logical restore handle each type of data set are in [Section 52.15](#). More detail on restore to different device types is in [Section 52.14](#).

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**20.01 CONTINUED . . .****CACHE  
SUPPORT**

If DSF is executed on a disk device which is connected to a caching control unit such as the 3990 model 3, it will automatically avoid loading any new tracks into the cache for the data sets being dumped, printed, or restored. Tracks currently in the caching buffer belonging to other data sets will not be disturbed. Tracks in the cache that belong to the data sets being processed will be read from cache on a dump or print, and will be written to both cache and DASD on a restore.

On restore, DASD FAST WRITE, if enabled, will be bypassed.

**SMS SUPPORT**

On a system with IBM's SMS (System Managed Storage) active, DSF supports SMS management of data sets.

When dumping, DSF (as well as FDR and ABR) will backup SMS information from the VVDS and VTOC for both VSAM and non-VSAM data sets. This includes SMS class information (storage, management, and data classes), and SMS indicators.

When DSF restores a data set on a SMS system, SMS will be invoked for every data set which must be allocated, to decide if the data set should be managed by SMS, or allocated as non-SMS. The SMS storage class and management class ACS (Automatic Class Selection) routines will be invoked; they will be passed input class names:

- \* if the user specified STORCLAS=, NULLSTORCLAS, MGMTCLAS=, or NULLMGMTCLAS, those overriding values will be used.
- \* if the storage class or management class (or both) were not overridden by the user, the class associated with the input data set will be used (if the input data set was not SMS-managed, a null class will be passed). The ACS routines may accept those classes, or override them with different values or even null values.

If SMS assigns a storage class to a data set, it will be SMS-managed; SMS will be invoked again to allocate the data set on a volume chosen by SMS. If no storage class is assigned, DSF will allocate the data set on a non-SMS volume (a target non-SMS volume must be indicated by a DISKx DD statement or a NVOL= operand on the SELECT statement). Even if data sets are allocated by SMS on a number of different volumes, DSF will restore those data sets in one pass of the backup file.

So, DSF can be used to convert data sets to SMS management, simply by updating the SMS ACS (automatic class selection) routines to assign storage classes to the restored data sets, or by specifying a storage class via the STORCLAS= operand on the SELECT statement. Data sets can be converted back to non-SMS if the ACS routines assign no storage class or the NULLSTORCLAS operand is specified. However, FDRCOPY ([Section 21](#)) may be a better choice for conversion of data sets.

Storage administrators, with proper authority, can override or bypass many of the SMS functions, to directly specify SMS classes, or to specify the volume serial on which SMS data sets are to be restored, by use of the BYPASSACS and BYPASSSMS operands on the RESTORE statement.

More detail on SMS support is in [Section 52.50](#).

**PROCESSING  
SPECIFIC  
TYPES OF  
DATA SETS**

Details of DSF and ABR processing for various types of data sets is in [Section 52.15](#).

**20.02 DSF PROCESSING OPTIONS, PERFORMANCE AND REQUIREMENTS****DSF DUMP  
OPTIONS**

DSF provides four control statement formats to specify what to DUMP.

**A. DATA SET NAME FORMAT**

Dump the data set(s) or cluster(s) specified by fully-qualified name or using generic data set selection.

**B. DD NAME FORMAT**

Dump the data set specified on the DD Statement named by the DD= parameter.

**C. DUMP ALL DATA SETS**

Dump all data sets on the disk volumes specified. The VTOC and label track will also be dumped.

**D. TRACK ADDRESS FORMAT**

Dump the tracks within the bounds specified by the FROM and TO address parameters.

DSF will accept up to 250 individual control statements (unless overridden) in a single execution. DSF can dump any number of data sets in one execution using the ALLDSN or DSN=filter parameter. DSF will DUMP all disk volumes specified by the DISKx DD statements to the tapes identified by corresponding TAPEx DD statements.

**DSF RESTORE  
OPTIONS**

DSF provides five control statement formats to specify what to RESTORE.

**A. DATA SET NAME FORMAT**

Restore the data sets or clusters specified by the DSN= parameter to the data sets with the same name.

**B. DATA SET NAME/NEWNAME FORMAT**

Restore the data sets or clusters specified by the DSN= parameter to the data sets named by the NEWNAME=, NEWGROUP=, or NEWINDEX= parameter.

**C. DD NAME FORMAT**

Restore the data set specified on the DD statement named by the DD= parameter to the data set of the same name.

**D. DDNAME/NEWNAME FORMAT**

Restore the data set specified on the DD statement named by the DD= parameter to the data set named by the NEWNAME=, NEWGROUP=, or NEWINDEX= parameter.

**E. TRACK ADDRESS FORMAT**

Restore the tracks within the bounds specified by the FROM and TO address parameters.

DSF will accept up to 250 individual control statements (unless overridden) in a single execution. DSF will RESTORE from the tape or disk backup files identified by TAPEx DD statements, to one or more output disk volumes. The backup files may have been created by DSF, FDR, ABR or SAR.

DSF formatted tapes created by Track Address operations must be restored with Track Address operations.

DSF can restore any number of data sets in one execution using the ALLDSN or DSN=filter parameter, limited only by the size of the region.

**MEMORY  
REQUIRE-  
MENTS**

The DSF DUMP basic memory requirement is identical to FDR's Memory Requirement. (See [Section 10.02](#)).

DSF DUMP processing imposes no increase over the basic memory requirement unless more than 250 control statements are processed, or more than 600 ICF VSAM components exist on a disk to be dumped.

DSF RESTORE processing requires a region of 512K plus about 512 bytes for each data set or disk segment to be processed. ICF VSAM clusters may add an additional 1K bytes per component processed.

Some logical RESTORE operations may require additional memory, so a region of 1024K or more is recommended.

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## 20.02 CONTINUED . . .

<b>DSF ERROR DETECTION</b>	DSF will dump or restore the data set(s) specified by the user. If any of the data sets do not exist or are in error, DSF will continue the dump or restore operation for the remainder of the data sets. An error message will be posted for the data sets in error and a U0888 abend will be issued for the step at completion.
<b>DSF DUMP/ RESTORE PERFOR- MANCE</b>	DSF dumps and restores at the same physical speed as FDR. The most important performance feature of DSF, however, is its basic facility to RESTORE any number of data sets from a full volume backup tape. DSF can save many hours of work when the time comes to implement installation recovery plans.
<b>PERFOR- MANCE OPTION</b>	As a default, during a dump operation, DSF will acquire enough buffers to retain a cylinder of data in storage at a time (BUFNO=MAX), and will use an I/O technique involving the Read Multiple Count Key Data command or the Read Track command. This technique requires 1024K per concurrent backup without COMPRESS, or 2048K per concurrent backup with COMPRESS. The virtual storage for these buffers is located in the private area below 16 MB, and the real storage is located above 16 MB, if available. INNOVATION strongly recommends running with this technique for optimum performance. However, if the installation does not have sufficient storage to support this technique, it is possible to request a smaller number of buffers. In that case a slower I/O technique will be used. A smaller number of buffers may be requested by changing the installation default ( <a href="#">See Section 91 or 92</a> ), or at execution time by specifying BUFNO=nn. The storage requirement is about 58K per buffer for 3390 and about 50K per buffer for other devices.
<b>DUPLICATE TAPE OPTION</b>	<p>DSF has an option to create a duplicate or second copy of the backup data set during dump processing. When several volumes are dumped duplicate backup files may be made for one or more of the disks regardless of the others.</p> <p>To create a duplicate backup file during the DUMP a TAPEX/TAPEXX set of DD statements are used in conjunction with the DISKX DD statement. Creating a duplicate backup uses no additional memory.</p>
<b>COMPRESS OPTION</b>	<p>DSF can be instructed to compress the data on the sequential backup file. This option will decrease the number of bytes transferred to the backup. The compressed file will usually be 20 to 50% smaller than an uncompressed file. However, the CPU time used by DSF to dump the disk will increase substantially.</p> <p>Compressed backups will be automatically recognized by DSF restore.</p> <p>INNOVATION strongly recommends running with COMPRESS and the default of BUFNO=MAX to substantially reduce tape usage and to reduce elapsed time, if CPU time and storage are available.</p>
<b>DATA SET ENQUEUE OPTION</b>	The user can specify that DSF is to test the availability of the data sets being dumped or restored. A data set is considered active if any job in the system, other than DSF, has allocated it. This is true whether the disposition specifies OLD, SHR or NEW. Any data set which is active will be dumped (unless the ENQERR=BYPASS operand is given) but not restored. A warning message will be issued if the data set is not available. In addition, the user can request that the data set is to be locked up (enqueued) during the execution of the dump or restore.

**20.03 DSF DUMP/PRINT JOB CONTROL REQUIREMENTS**

To execute DSF for a DUMP or PRINT operation, the following JCL statements are required.

**JOB  
STATEMENT**

The JOB Statement is user-specified and depends on user standards.

**STEPLIB or  
JOBLIB DD  
STATEMENT**

If required, specifies the load library in which DSF resides. The library must be APF authorized.

**EXEC  
STATEMENT**

Specifies the program name (FDRDSF), region requirement, and PARM field. If a PARM field is specified, DSF will use data specified as the first control statement, which must be a valid DUMP or PRINT statement; if the PARM data contains a slash (/), the data after the slash will be used as the second control statement (usually a SELECT). If FDRDSF is invoked from a user program, Register 1 must follow IBM's convention for passing data from the PARM field. [See Section 20.02](#) for region requirements.

**SYSPRINT DD  
STATEMENT**

Specifies the output message data set. Usually a SYSOUT data set. Must be present.

**SYSUDUMP DD  
STATEMENT**

Specifies the ABEND dump data set. Usually a SYSOUT data set. A SYSUDUMP DD statement should always be included to assist in error diagnosis.

**DISKx DD  
STATEMENT**

Specifies the unit, volume serial and disposition of the input disk volume.

Example: //DISK1 DD UNIT=SYSDA, VOL=SER=DISK01, DISP=OLD

x may specify any valid alphanumeric character (0-9, A-Z) and must have a corresponding TAPEx DD statement. The DUMP or PRINT will proceed for as many pairs of DISKx/TAPEx statements as are present. If DUMMY is specified, this DD statement will be ignored. The DISKx DD statement may use a cataloged data set to point to the disk pack by specifying the data set name and disposition; this data set need not be processed during the DSF run. However, a DISKx DD may point to only one disk volume.

**TAPEx DD  
STATEMENT**

On DUMP Operations -- Specifies a backup tape data set or sequential data set on disk. DUMMY is supported. When TAPEx references a disk data set, a sequential backup is created in the data set pointed to by this DD statement. UNIT=AFF or VOL=REF may be specified, referencing another TAPEx DD statement; this dump will be serialized by DSF, running after the previous tape dump has completed.

You should specify a volume count on the TAPEx DD statement if any significant amount of data may be dumped, since the system default is 5. A full 3380-K could require up to 12 3420 reels at 6250 BPI, or 9 3480 cartridges. Even with COMPRESS or IDRC reducing the volume of tape, the backup can exceed 5 volumes. If a DD statement does not specify a volume count, and the data set exceeds 5 volumes, the Operating System gives an S837 ABEND.

On PRINT Operations -- Specifies the output print data set. Usually a SYSOUT data set.

There must be a TAPEx statement matching every DISKx statement.

**TAPExx DD  
STATEMENT**

Specifies a second copy of the backup is to be created (for DUMP only). A duplicate backup file for TAPEx will be produced on TAPExx. For example, if DISK6 is being dumped to TAPE6, the inclusion of a TAPE66 DD statement will cause a second backup file to be produced.

**SYSPRINx DD  
STATEMENT**

Specifies the output data set for messages related to the matching DISKx when the ATTACH option is used. Must be present if ATTACH is used; not needed otherwise. Usually a SYSOUT data set.

**SYSIN DD  
STATEMENT**

Specifies a data set containing the control statements for DSF. Usually a DD \* data set. Required for DSF.

## 20.04 DSF DUMP Command

```

DUMP
D      TYPE=DSF
      ,ATTACH
      ,BUFNO=nn / MAX
      ,COMPRESS=ALL / COPY1 / COPY2
      ,DATA=ALL / USED
      ,DSN=VTOC
      ,DSNENQ=NONE / TEST / USE / HAVE
      ,ENQ=ON / OFF / RESERVE
      ,ENQERR=NO
      ,ENQERR=BYPASS / PROCESS
      ,FORMAT=OLD / NEW / SPLIT
      ,ICFCORE=nnnnnn
      ,LBPZERO=VALID / INVALID
      ,MAXCARDS=nnnnn
      ,MAXERR=nnnn
      ,SELTERR=NO / YES

```

**DUMP  
COMMAND**

This control statement is required for a DUMP operation. It must be the first control statement. It must be followed by one or more SELECT statements and optionally one or more EXCLUDE statements to specify the data sets or tracks to be dumped (unless DSN=VTOC is specified and the VTOC is the only thing to be dumped).

**OPERANDS****TYPE=DSF**

Specifies the type of dump. Must be specified on DUMP command.

**ATTACH**

Specifies that DSF is to dump the disk volumes concurrently. DSF will attach a subtask for each unique tape drive specified. If a TAPEX DD statement specifies the same tape drive as another TAPEX DD statement, DSF will serialize those backups.

Default is that DSF will process each DISKx/TAPEX pair one at a time, in the order that the DISKx DD's appear in the JCL.

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## 20.04 CONTINUED . . .

<b>BUFNO=</b>	<p>Specifies the FDRCOPY performance option.</p> <p><b>MAX</b> — is the default and specifies that FDRCOPY is to acquire enough buffers to retain a cylinder of data in storage at a time. It can be overridden but the alternate performance option is much slower and is not recommended.</p>
<b>COMPRESS=</b>	<p><b>ALL</b> — specifies that DSF is to compress the output data on the backup file for both copies (TAPEX and TAPEXX).</p> <p><b>COPY1</b> — specifies that only the data on the TAPEX DD statement will be compressed.</p> <p><b>COPY2</b> — specifies that only the data on the TAPEXX DD statement will be compressed.</p> <p>Add 1024K to the memory requirement for each concurrent dump subtask when COMPRESS= is specified.</p> <p>Default is that the backup tapes will not be compressed</p>
<b>DATA=</b>	<p><b>USED</b> — specifies that DSF is to dump only the used portion of PS or PO type data sets. On most packs, this will make the dump run faster, but at the risk of not backing up all of the data if data sets have invalid last block pointers.</p> <p>If the data set has a last block pointer of all zeroes, which usually means it was never used, DSF will default to dumping the entire data set unless LBPZERO=VALID is specified. With LBPZERO=VALID, DSF will dump only the first track.</p> <p><b>ALL</b> — specifies that DSF is to dump the entire data set.</p> <p>Default is USED.</p>
<b>DSN=VTOC</b>	<p>Specifies that DSF is to dump the VTOC and volume label track in addition to any selected data sets. If DSN=VTOC is specified, the VTOC can only be restored by absolute track. If the VTOCIX (indexed VTOC) and/or VVDS are required, they must be named on SELECT statements.</p> <p>(Example: DSN=SYS1.VTOCIX.** and DSN=SYS1.VVDS.V**).</p>

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## 20.04 CONTINUED . . .

**DSNENQ=**

Specifies that DSF is to enqueue all of the data sets on the volume being dumped. DSF will issue an exclusive enqueue with a major name of 'SYSDSN' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, DSF will issue a warning message for the data set. The data set will still be dumped unless ENQERR=BYPASS is specified.

A U0888 ABEND will be issued at the end of the DSF execution unless ENQERR=NO is specified. DSNENQ= is independent of ENQ= which prevents new data sets from being allocated or old data sets from being scratched.

**TEST**—The data sets will only be tested to see if they are active at the time the dump starts. The data sets will not be enqueued.

**USE**—The data sets will be enqueued for the duration of the dump. If not available, only a warning message is issued and the data set will not be enqueued.

**HAVE**—The data sets will be enqueued for the duration of the dump. If not available, DSF will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. If WAIT is specified, DSF will wait for the data set to become available. The job could time out. If NOWAIT is specified, DSF will print a warning message for the data set and will not issue the enqueue. If RETRY is specified, DSF will attempt the enqueue again.

**NONE**—This is the default. No data set ENQ will be issued

**NOTE:** If the data set is specified in a DD statement in the DSF job with DISP=SHR, DSF will change the scheduler enqueue for the data set to EXCLUSIVE (DISP=OLD) if the user specifies TEST, USE or HAVE. The operator cannot respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.

**CAUTION:** This option should not be used on shared DASD unless a cross-system enqueue facility is available and the SYSDSN QNAME is broadcast across systems. Without this capability, DSF can only determine which data sets are active on the system DSF is running on.

**ENQ=**

**ON** — specifies that DSF is to perform an enqueue on the VTOC during the dump operation. This enqueue will prevent other tasks from allocating new data sets or scratching old data sets on the system DSF is running on.

**RESERVE**— specifies that DSF will issue a RESERVE on the volume being dumped. This command will lock out a shared DASD system from accessing the pack.

**OFF** — specifies that DSF will not enqueue the VTOC during the dump. Default is OFF.

**ENQERR=**

**NO** — specifies that DSF will not issue a U0888 ABEND at the end of the DSF execution if the DSNENQ= option is used and a data set is found to be active. Default is that DSF will issue the U0888 ABEND.

**ENQERR=**

**BYPASS** — specifies that DSF not dump a data set if the DSNENQ= option is used and the data set is found to be active.

**PROCESS** — specifies that DSF is to dump a data set even if the DSNENQ= option found it to be active (a warning message will still be produced).

Default is PROCESS.

**NOTE:** both ENQERR=NO and ENQERR=BYPASS/PROCESS may be specified on the same DUMP statement.

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## 20.04 CONTINUED . . .

<b>FORMAT=</b>	<p>Specifies the format of the sequential backup file.</p> <p><b>OLD</b> — specifies that DSF is to create the backup using the format prior to Ver 4.5. This option will switch to SPLIT if the backup is of 3380 or 3390 disk.</p> <p><b>NEW</b> — specifies that FDR is to create the backup using a maximum of a 56K blocksize.</p> <p><b>SPLIT</b> — specifies that DSF is to create the backup using a maximum blocksize of 32K. DSF will split the backup blocks into multiple records.</p> <p>WARNING: If you use normal copy program (ex: IEBGENER) to copy a backup file created with FORMAT=NEW, you will not get any error messages, but the resulting tape will not be useable for a restore. Tapes in the new format must only be copied with the INNOVATION provided tape copy program (FDRTCOPY) or FATAR. If FORMAT=OLD or SPLIT is specified, DSF will ignore the BUFNO option.</p> <p>Default is NEW if backup is on tape — SPLIT if backup is on disk.</p> <p>Use of FORMAT=OLD or SPLIT will result in a large increase elapsed time.</p>
<b>ICFCORE=</b>	<p>Specifies that DSF is to increase the size of the table used to store the ICF VSAM cluster and component names. DSF needs to save all of the component names and their associated clusters which currently exist on the volume. nnnnnn is specified in bytes and must be large enough to contain all the VSAM names.</p> <p>NOTE: Specifying ICFCORE= will increase the DSF memory requirement by the value specified. The default value imposes no additional memory requirement.</p> <p>Default is 49152 bytes, which normally holds about 600 ICF VSAM components. If the input disk is a 3390, the default is 53248, which will hold about 650 components.</p>
<b>LBPZERO=</b>	<p><b>VALID</b> — specifies that DSF is to consider PS data sets which are empty (last block pointer of zero) as containing one used track.</p> <p><b>INVALID</b> — specifies that DSF will consider PS data sets which are empty as fully used.</p> <p>WARNING: Care should be taken using VALID since certain data sets may have the last block pointer as all zeroes and not be empty. EX: SYS1.DUMP data sets.</p> <p>Default is INVALID unless overridden in the FDR/ABR global option table (<a href="#">See Section 91 or 92</a>).</p>
<b>MAXCARDS=</b>	<p>Enables DSF to accept additional control statements.</p> <p>Default is a maximum of 250 control statements.</p>
<b>MAXERR=</b>	<p>Specifies the number of tape or disk errors that are permitted by DSF prior to ABENDING the dump operation. MAXERR may specify a value from 1 to 9999 errors.</p> <p>WARNING: MAXERR over the default value may result in the loss of many data sets. This option should only be used when necessary and with care.</p> <p>Default is 20 errors.</p>
<b>SELTERR=</b>	<p><b>NO</b> — specifies that DSF is not to issue a U0888 ABEND if a SELECT statement is not referenced.</p> <p><b>YES</b> — specifies that DSF will issue a U0888 abend at the end of the DUMP if any SELECT/EXCLUDE statement did not apply to any data set on any input disk.</p> <p>Default is YES unless overridden in the FDR/ABR global option table (<a href="#">See Section 91 or 92</a>).</p>



## 20.05 DSF PRINT Command

**PRINT**

**P**                    **TYPE=DSF**  
                       **,DATA=ALL / USED**  
                       **,DSN=VTOC**  
                       **,ENQ=ON / OFF / RESERVE**  
                       **,LBPZERO=VALID / INVALID**  
                       **,MAXCARDS=nnnnn**  
                       **,MAXERR=nnnn**

**PRINT  
COMMAND**

This control statement is required for a PRINT operation. It must be the first control statement. It must be followed by one or more SELECT statements and optionally one or more EXCLUDE statements to specify the data sets or tracks to be printed (unless DSN=VTOC is specified and the VTOC is the only thing to be printed).

DSF will print the data sets or tracks specified in storage dump format (hexadecimal and EBCDIC) and will write this report to the TAPEX data set. The logical record length is 121. This data set is usually SYSOUT or may be a sequential data set on tape or disk. User may override the blocksize on the JCL. Default blocksize on tape or disk is 1210.

**OPERANDS**

<b>TYPE=DSF</b>	Specifies the type of PRINT. Must be specified on PRINT command.
<b>DATA=</b>	<p><b>USED</b> — specifies that DSF is to print only the used portion of PS or PO type data sets. If the data set has a last block pointer of all zeroes (which usually means it was never used), DSF will print the entire data set unless LBPZERO=VALID is specified. With LBPZERO=VALID, DSF will print only the first track.</p> <p><b>ALL</b> — specifies that DSF is to print the entire data set.</p> <p>Default is USED.</p>
<b>DSN=VTOC</b>	Specifies that DSF is to print the VTOC and volume label track in addition to any selected data sets.
<b>ENQ=</b>	<p><b>ON</b> — specifies that DSF is to perform an enqueue on the VTOC during the print operation. This enqueue will lock out users from allocating new data sets or scratching old data sets.</p> <p><b>RESERVE</b> — specifies that DSF will issue a RESERVE on the volume being printed. This command will lock out a shared DASD system from accessing the pack.</p> <p><b>OFF</b> — specifies that DSF will not enqueue the VTOC during the PRINT.</p> <p>Default is OFF.</p>
<b>LBPZERO=</b>	<p><b>VALID</b> — specifies that DSF is to consider PS or PO data sets which are empty (last block pointer of zero) as containing one used track.</p> <p><b>INVALID</b> — specifies that DSF will consider PS or PO data sets which are empty as fully used.</p> <p>WARNING: Care should be taken using VALID since certain data sets may have the last block pointer as all zeroes and not be empty. EX: SYS1.DUMP data sets.</p> <p>Default is INVALID unless overridden in the FDR/ABR global option table (<a href="#">See Section 91 or 92</a>).</p>
<b>MAXCARDS=</b>	<p>Enables DSF to accept additional control statements.</p> <p>Default is a maximum of 250 control statements.</p>
<b>MAXERR=</b>	<p>Specifies the number of disk errors that are to be bypassed by DSF prior to ABENDING the print operation. MAXERR may specify a value from 1 to 9999 errors.</p> <p>Default is 20 errors.</p>

## 20.06 DSF SELECT COMMAND -- FOR DUMP OR PRINT

```

SELECT      DSN=filter
S           DD=ddname
              ALLDSN

EXCLUDE     FROM(CYL=cccc,TRK=tttt),TO(CYL=cccc,TRK=tttt)
X           ,DATA=ALL
              ,DSN,DSORG=(xx,xx,...)
              ENQ=NONE
              ,TAPEDD=x

```

**SELECT  
DATA SET  
COMMAND  
FOR DUMP  
or PRINT**

This control statement selects the data sets to be dumped or printed.

The **SELECT** command identifies the individual data set name, group of data sets, or absolute tracks to be processed. The **EXCLUDE** command identifies data sets from within those selected by SELECT statements which are not to be processed. All data sets in the VTOCs of DASD volumes specified by DISKx DD statements will be compared to these control statements to identify those to be processed; each data set will be compared to each control statement until a match is found. A maximum of 250 of these control statements may be used in one execution unless overridden by MAXCARDS=.

**The control statements are always scanned in the order in which they were input, so in general, EXCLUDE statements should precede SELECT statements.** Since DSF will only dump or print data sets which are selected, EXCLUDE statements are required only to exclude certain data sets from within a larger group on a SELECT statement, and can also be used to EXCLUDE certain tracks.

Example 1. Select all data sets with a first index of "A" except those with a second index of "B":

```

EXCLUDE DSN=A. B. * *
SELECT  DSN=A. * *

```

Example 2. Select all data sets except partitioned (PDSs):

```

EXCLUDE ALLDSN, DSORG=PO
SELECT  ALLDSN

```

**DUMPING ICF  
VSAM FILES**

ICF VSAM clusters can be selected by specifying the fully-qualified base cluster name or matching on the base cluster with generic data set selection. When selected, all components of that cluster that exist on the volumes being processed will be dumped or printed, including alternate indexes and key range components. DSF will not examine ICF VSAM component names when processing SELECT/EXCLUDE statements; components will be selected only if their cluster name is selected. For further information, [see Section 52.11](#), VSAM SPECIAL CONSIDERATIONS.

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<b>OPERANDS</b>	<b>DSN=</b>	<p>Specifies a fully-qualified data set name or a filter to be used for generic data set selection, as described in <a href="#">Section 52.16</a>. This name or filter will be used when scanning the VTOCs of selected volumes.</p> <p>EXAMPLES:    DSN=USER1. JCL. CNTL</p> <p>                 DSN= * * LI ST</p> <p>                 DSN=PROD+ . * * . LI B *</p> <p>DSN= does not have any special support for selecting GDGs.</p> <p>NOTE: The DSG= operand documented in previous versions of DSF is still accepted, but the DSN= operand with a generic data set name filter is the preferred way of selecting groups of data sets.</p>
	<b>DD=</b>	<p>Specifies that a data set name is to be taken from a DD statement. This operand must point to the DDNAME of a JCL statement. Using this option enables the user to specify a non-standard data set name or a generation data set name.</p> <p>EXAMPLE:    SELECT            DD=DD1</p> <p>                 //DD1 DD    DSN=A. B. C ( O ) , DI SP=SHR</p>
	<b>ALLDSN</b>	<p>Specifies that DSF is to select all the data sets on the volumes specified. The VTOC and volume label track are not dumped using ALLDSN. (<a href="#">See DSN=VTOC in Sections 20.04 and 20.05.</a>)</p>
	<b>FROM/TO</b>	<p>Specifies an absolute track dump or print of the tracks specified. The values are specified in decimal, relative to zero. The alternate tracks of a volume cannot be dumped. For example, valid specification on a 3390-2 are CYL=0 TRK=0 to CYL=2225 TRK=14. The FROM address must not be higher than the TO address. If the FROM track is not specified, zero is assumed. If the TO track is not specified, the last track of the cylinder is assumed. Absolute track commands can be mixed with SELECT commands for data sets. The FROM and TO operands must appear on the same control record, and cannot be continued. FROM/TO cannot be used on an EXCLUDE command.</p> <p>NOTE: DSN, DD, ALLDSN and FROM/TO are mutually exclusive. One and only one of these operands must be specified on each SELECT or EXCLUDE card.</p>
	<b>DATA=</b>	<p><b>ALL</b> — specifies that DSF will dump or print the entire data set. Should be used if the last block pointer is invalid on certain data sets.</p> <p>Default is that DSF will dump or print only up to the last block pointer for PS and PO data sets unless DATA=ALL was specified on the DUMP or PRINT statement.</p>
	<b>DSNENQ=</b>	<p><b>NONE</b>— specifies that DSF is to bypass the data set enqueue for this data set.</p> <p>Default is the enqueue option is determined by the DSNENQ option specified on the DUMP or PRINT statement.</p>

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## 20.06 CONTINUED . . .

**DSORG=** Specifies that the data sets are not to be selected unless their DSORG matches one of the DSORGs specified. If more than one DSORG is specified, they must be enclosed in parentheses.

VALID DSORGS are:

DA	—	BDAM	UN	—	UNDEFINED	EF	—	ICF VSAM
IS	—	ISAM	PS	—	SEQUENTIAL	UM	—	UNMOVABLE
AM	—	ALL VSAM	PO	—	PARTITIONED			

**TAPEDD=** x -- specifies the same character as specified in a TAPEx DD statement. If this operand is specified, then this SELECT/EXCLUDE will only apply to data sets on the input disk volume specified by the DISKx DD statement. TAPEDD= might be used when multiple DISKx DD statements point to the same volume to select which data sets are to go to which backups.

NOTE: TAPEDD should be used when the DISKx DD statements specify dsnames, using the catalog to determine the volumes on which the data sets reside. In that case, it may happen that more than one DISKx DD statement points to the same volume. If so, every requested data set that resides on the same volume will be dumped once for each DISKx DD statement pointing to that volume, unless TAPEDD is specified.

CONTINUED . . .

**20.06A DSF RESTORE JOB CONTROL REQUIREMENTS**

To execute DSF for a RESTORE operation, the following JCL statements are required.

**JOB  
STATEMENT**

The JOB Statement is user-specified and depends on user standards.

**STEPLIB or  
JOB LIB DD  
STATEMENT**

If required, specifies the load library in which DSF resides. The library must be APF authorized.

**EXEC  
STATEMENT**

Specifies the program name (FDRDSF), region requirement, and PARM field. If a PARM field is specified, DSF will use the data specified as the first control statement, which must be a valid RESTORE statement; if the PARM data contains a slash (/), the data after the slash will be used as the second control statement (usually a SELECT). If FDRDSF is invoked from a user program, Register 1 must follow IBM's convention for passing data from the PARM field. [See Section 20.02](#) for region requirements.

**SYS PRINT DD  
STATEMENT**

Specifies the output message data set. Usually a SYSOUT data set.

**SYS DUMP DD  
STATEMENT**

Specifies the ABEND dump data set. Usually a SYSOUT data set. A SYS DUMP DD statement should always be included to assist in error diagnosis.

**TAPE x DD  
STATEMENT**

Specifies the input backup data set on tape or disk, from which data is to be restored. x may specify any valid alphanumeric character (0-9, A-Z). There may be up to 36 such TAPE x DD statements; DSF will restore from each in turn in the order they appear in the JCL.

Each may point to a FDR, DSF, ABR or SAR backup. Backups may not be concatenated on a single TAPE x.

**DISK x DD  
STATEMENT**

Specifies the unit, volume serial and disposition of an output disk volume. The DISK x DD statement is optional; DSF will dynamically allocate required output volumes if necessary. If present, the volume pointed to by the DISK x DD statement will be used to restore data sets selected from the TAPE x backup file, unless overridden by SMS or the NVOL= operand. Complete rules for output volume selection are in [Section 20.07](#).

Example:

```
//DI SK1 DD UNI T=SYSDA, VOL=SER=DI SK01, DI SP=OLD
```

Only one disk volume serial may be specified on a DISK x DD.

x may specify any valid alphanumeric character (0—9, A—Z) and must have a corresponding TAPE x DD statement. If DUMMY is specified, this DD statement will be ignored. The DISK x DD statement may use a cataloged data set to point to the disk pack by specifying the data set name and disposition. Note that this data set need not be processed during the DSF run.

**SYS IN DD  
STATEMENT**

Specifies a data set containing the control statements for DSF. Usually a DD \* data set. Required for DSF.

## 20.07 DSF RESTORE Command

```

RESTORE
R          TYPE=DSF
              ,BLKF=nn
              ,BYPASSACS
              ,BYPASSSMS
              ,CATIFALLOC
              ,DATA=ALL / USED
              ,DSNENQ=NONE / TEST / USE / HAVE
              ,ICFCAT=ORIGINAL / STEPCAT / ALIAS
              ,MAXCARDS=nnnn,MAXERR=nnnn
              ,NOCAT,RECAT
              ,PRESTAGE
              ,RLSE,%FREE=nn
              ,SELTERR=NO / YES
              ,MSGDG=DEFERRED / ACTIVE / ROLLEDOFF / INPUT
              ,VRECAT

```

**RESTORE  
COMMAND**

This control statement is required for a RESTORE operation. Only one is allowed per execution, and it must be the first control statement. It must be followed by one or more SELECT statements, and optionally EXCLUDE statements, to specify the data sets to be restored.

DSF will read each backup file specified on a TAPEX DD statement and will restore one or more data sets as indicated by the SELECT and EXCLUDE statements which follow ([See Section 20.08](#)). While reading a backup file, DSF can restore the selected data sets to one or more disk volumes concurrently. The target disk volume will be selected for each data set by the following rules:

- \* If the NVOL= operand was specified on the SELECT statement which selected this data set, that volume or volumes will be used. If NVOL= specified more than one volume serial, the first of those volumes will be selected; allocation may be attempted on up to 64 of those volumes in turn until it is successful. If the NVOL list includes more than one type of disk device, those with the same type as the input data set ("like" devices) will be tried first. Any volumes in the NVOL list which are not online will be ignored.
- \* If a DISKx DD statement matching the TAPEX DD from which the data set is being restored is present in the DSF JCL, then the disk to which it points will be selected for output.
- \* If the output data set name (the original name, or the newname if the NEWNAME=, NEWGROUP=, or NEWINDEX= operand was specified on the SELECT statement which selected the data set) is cataloged, then the volume to which it is cataloged will be chosen.  
If the data set is cataloged as being on multiple volume serials, then the volser will be selected from that list based on the volume sequence number in the F1 DSCB (field DS1VOLSQ) of the input data set.
- \* If none of the above apply, then the serial of the volume from which the data set was dumped, as recorded on the backup data set, will be used.

If SMS (System Managed Storage) is active on this system, and the data set does not already exist on the volume selected by the rules above, SMS is invoked to decide if the data set should be SMS-managed. If so, SMS will select an output volume. SMS rules are detailed in [Sections 20.01](#) and [52.50](#).

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## 20.07 CONTINUED . . .

<b>OPERANDS</b>	<b>TYPE=DSF</b>	Specifies the type of RESTORE. Must be specified on the RESTORE command.
	<b>BLKF=</b>	<p>Specifies that DSF is to reblock PS fixed and variable record format and PO data sets. Except when restoring a PS file to a smaller disk the blocking factor must result in a larger blocksize, otherwise it will be ignored. On partitioned data sets, DSF will set the blocksize to a higher value, but will not actually reblock the members.</p> <p>BLKF= specifies a value of 1 to 10. 1 is full track blocking (max 32760), 2 half track, to 10 for a tenth of a track blocking. On fixed files DSF will round down to a multiple of the LRECL.</p> <p>Default is that DSF will not reblock data sets. The restore will fail if the input data set has blocks larger than the track size of the output disk.</p>
	<b>BYPASSACS</b>	<p>On a system with SMS (System Managed Storage) active, specifies that the SMS ACS (Automatic Class Selection) routines are not to be invoked for data sets which must be allocated by DSF. If a data set has a SMS storage class assigned (see STORCLAS= in <a href="#">Section 20.08</a>) it will be SMS-managed, and SMS will be invoked to allocate the data set on an SMS-chosen volume, but SMS will not be allowed to override the storage class or management class assigned to the data set.</p> <p>Default is that on an SMS system, the SMS ACS routines will be invoked for every data set which has to be allocated. The assigned storage and management classes will be passed to those routines, which can approve or override them. A data set will be passed to SMS for allocation if the storage class ACS routine assigns a storage class to the data set.</p>
	<b>BYPASSSMS</b>	<p>On a system with SMS (System Managed Storage) active, specifies that DSF is to directly allocate data sets on SMS-managed volumes, bypassing normal SMS storage group and volume selection. The selected output volume must be a SMS-managed disk volume, and the data sets being restored must have a SMS storage class assigned (see BYPASSACS above and STORCLAS= in <a href="#">Section 20.08</a>). DSF will allocate and catalog the data sets according to SMS standards.</p> <p>Normal SMS facilities do not allow allocation of data sets on specific volume serials, but BYPASSSMS will do so, allowing data sets to be located for performance or other reasons. Note that if BYPASSACS is also specified, the assigned SMS classes will not be validity- or authority-checked.</p> <p>Default is that on an SMS system, for data sets which are SMS-managed and must be allocated, the SMS storage group ACS routine will be invoked to select a storage group and SMS will select a SMS-managed volume and allocate and catalog the data sets.</p> <p>BYPASSACS and BYPASSSMS are primarily for use by storage administration personnel, since they bypass normal SMS allocation controls and rules. In order to use BYPASSACS or BYPASSSMS, the user of DSF must be authorized to the RACF profile</p>
		<p>STGADMIN.ADR.RESTORE.BYPASSACS</p> <p>in class FACILITY, or the equivalent in other security systems.</p>
	<b>CATIFALLOC</b>	<p>Specifies that non-VSAM output data sets will be cataloged by DSF even if they were preallocated (not allocated by DSF); the output data set will be cataloged if it is not already cataloged on another volume (unless the RECAT operand was specified).</p> <p>Default is that DSF will catalog the output data sets only when it allocates them.</p>

CONTINUED . . .

## 20.07 CONTINUED . . .

- DATA=** **ALL** — specifies that DSF will restore the entire data set. ALL should not be specified unless the backup was taken using the DATA=ALL option (defaulted to in FDR).  
DATA=ALL should not be specified with RLSE and %FREE.  
**USED** — specifies that DSF will only restore the used portion of the data set for PS or PO files.  
Default is USED.
- DSNENQ=** Specifies that DSF is to enqueue all of the data sets being restored. DSF will issue an exclusive enqueue with a major name of 'SYSDSN' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, DSF will issue a warning message for the data set. The data set will not be restored. A U0888 will be issued at the end of the DSF execution unless ENQERR=NO is specified. DSF will not enqueue on data sets which it has allocated.
- TEST** — The data sets will only be tested to see if they are active at the time the restore starts. The data set will not be enqueued.
- USE** — The data sets will be enqueued for the duration of the restore. If not available, the data set will not be restored.
- HAVE** — The data sets will be enqueued for the duration of the restore. If not available, DSF will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. If WAIT is specified, DSF will wait for the data set to become available. The job could time out. If NOWAIT is specified, DSF will print a warning message for the data set and will not restore the data set. If RETRY is specified, DSF will attempt the enqueue again.
- NONE** — This is the default. No data set ENQ will be issued.
- NOTE:** If the data set is specified in a DD statement in the DSF job with DISP=SHR, DSF will change the scheduler enqueue for the data set to EXCLUSIVE (DISP=OLD) if the user specifies TEST, USE or HAVE. The operator cannot respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.
- CAUTION:** This option should not be used on shared DASD unless a cross-system enqueue facility is available and the SYSDSN QNAME is broadcast across systems. Without this capability, DSF can only determine which data sets are active on the system DSF is running on.
- ICFCAT=** ICF VSAM files only. Specifies the source of the catalog name to be used by DSF if an output ICF VSAM cluster is to be allocated.
- ORIGINAL** — on a restore to the same name, specifies that DSF is to use the catalog in which the original dumped cluster was cataloged.
- On a restore to a new name, ICFCAT=ORIGINAL is ignored, and ICFCAT=ALIAS normally is used. If it is desired to catalog the output cluster into the same catalog as the input cluster, the user must specify ICFCAT=STPCAT, and must supply a STEPCAT DD statement pointing to that catalog.
- STPCAT** — specifies that DSF is to use the STEPCAT as the catalog. If a STEPCAT DD statement is not supplied, DSF will use the master catalog or the catalog which is aliased for this data set in the master catalog.
- ALIAS** — specifies that DSF is to determine the catalog from the alias name in the master catalog. If no alias is found, and the cluster is being restored to the same name, DSF will use the input cluster's catalog. If no alias is found, and the cluster is being restored to a new name, DSF will use the STEPCAT (if present in the JCL) or the master catalog. Multi-level alias is supported.
- Default: ORIGINAL, except that if the cluster is being restored to a newname (NEWGROUP or NEWINDEX specified) the default is ALIAS. If the output cluster is SMS-managed, ALIAS is forced.
- MAXCARDS=** Enables DSF to accept additional control statements.  
Default is a maximum of 250 control statements.
- MAXERR=** Specifies the number of tape or disk errors that are to be bypassed by DSF prior to ABENDING the restore operation. MAXERR may specify a value from 1 to 9999 errors.  
Default is 20 errors.

CONTINUED . . .



## 20.07 CONTINUED . . .

<b>NOCAT RECAT</b>	<p><b>NOCAT</b> specifies that DSF will not catalog any output data sets. This option is ignored for ICF VSAM clusters and SMS-managed data sets, since these must always be cataloged.</p> <p><b>RECAT</b> specifies that DSF should catalog non-VSAM output data sets even if they are currently cataloged to another volume.</p> <p>Default: DSF will catalog output non-VSAM data sets unless they are currently cataloged to another volume. Allocation of SMS-managed data sets will fail if they cannot be cataloged.</p> <p>NOTE: NOCAT and RECAT are mutually exclusive. DSF will normally only attempt to catalog output data sets which it allocates (not pre-allocated) unless the CATIFALLOC operand is specified.</p>
<b>PRESTAGE</b>	<p>Specifies that DSF is not to restore a data set if the output data set already exists on the selected output volume. This may be used to avoid restoring data sets which have already been restored.</p> <p>Default is that DSF will restore to pre-allocated data sets, overlaying the existing contents of those data sets. If the data sets do not exist, they will be <b>allocated</b>.</p>
<b>RLSE %FREE=</b>	<p><b>RLSE</b> — specifies that DSF is to release all of the unused space in the output data sets for selected PS and PO data sets.</p> <p><b>%FREE=nn</b> — specifies a percentage (nn%) of the PS and PO data sets to be left free after the restore. The data sets will not be expanded in size from the original allocation of the input data set. nn may range from zero (0) which will free all of the free space (same as RLSE) to 99 which attempt to leave the data sets with 99% free space.</p> <p>Space will be released only from data sets allocated by DSF.</p> <p>Default is that DSF allocate the output data sets the same size as the input data sets (unless overridden by TRK=/CYL= on the SELECT statement).</p>
<b>SELTERR=</b>	<p><b>NO</b> — specifies that DSF is not to issue a U0888 ABEND if a SELECT statement is not referenced.</p> <p><b>YES</b> — specifies that DSF will issue a U0888 abend at the end of the RESTORE if any SELECT/EXCLUDE statement did not apply to any data set on any backup data set.</p> <p>Default is YES unless overridden in the FDR/ABR global option table (<a href="#">See Section 91 or 92</a>).</p>
<b>SMSGDG=</b>	<p>Specifies the status of SMS-managed GDG (Generation Data Group) data sets, if allocated by DSF.</p> <p><b>DEFERRED, ACTIVE, or ROLLEDOUT</b> will set the GDG to that status.</p> <p><b>INPUT</b> will set the GDG to the original SMS status of the GDG generation, as recorded on the backup tape. If the original GDG was non-SMS, it will be set ACTIVE if that generation is currently cataloged, otherwise DEFERRED.</p> <p>Default is DEFERRED.</p>
<b>VRECAT</b>	<p>Allows ICF VSAM clusters to be allocated and cataloged even if they already exist in the target ICF catalog. If the output cluster does not exist on the output volume selected, but the cluster name is in the catalog, the cataloged cluster will be scratched (by DELETE or, if that fails, DELETE NOSCRATCH).</p> <p>VRECAT is useful when restoring a cluster when its catalog has been restored, but the cluster on disk has not, or when restoring a cluster to a new volume. VRECAT is ignored for ICF catalogs and when the restore does not include the base data component.</p> <p>Default is that ICF VSAM clusters cannot be allocated if the cluster name already exists in the catalog (even if the catalog points to the output volume).</p> <p><b>WARNING: VRECAT will DELETE the original cluster, with all its components, alternate indexes and PATHs, from the catalog and disks. If the DELETE fails for some reason, the DELETE NOSCRATCH may leave uncataloged components on disk.</b></p>

## 20.08 DSF SELECT COMMAND--FOR RESTORES

```

SELECT  DSN=filter | DD=ddname | ALLDSN
S      FROM(CYL=cccc,TRK=tttt),TO(CYL=cccc,TRK=tttt)
EXCLUDE
X      ,BLKF=nn

      ,DATA=ALL

      ,DATACLAS=dataclass | ,NULLDATACLAS

      ,DSNENQ=NONE

      ,MGMTCLAS=managementclass | ,NULLMGMTCLAS

      ,NEWNAME=newname | ,NEWGROUP=newgroup | ,NEWINDEX=newindex

      ,NEWDD=new ddname

      ,NOCAT,RECAT

      ,NVOL=(vvvvvvv,vvvvvvv,...)

      ,PRESTAGE

      ,RLSE,%FREE=nn

      ,STORCLAS=storageclass | ,NULLSTORCLAS

      ,TAPEDD=x

      ,TRK=nnnnn | ,CYL=nnnnn

      ,VRECAT

```

**SELECT  
DATA SET  
COMMAND  
FOR RESTORE**

This control statement selects the data sets to be restored. The SELECT command identifies the individual data set name, group of data sets, or absolute tracks to be processed. The EXCLUDE command identifies data sets or tracks from within those selected by SELECT statements which are not to be processed. All data sets in the backup files specified by TAPEX DD statements will be compared to these control statements to identify those to be processed; each data set will be compared to each control statement until a match is found. EXCLUDE statements should only contain the operands DSN=, DD=, ALLDSN, FROM, and TAPEDD=. A maximum of 250 of these control statements may be used in one execution unless overridden by MAXCARDS=.

The control statements are always scanned in the order in which they were input, so in general, EXCLUDE statements should precede SELECT statements. Since DSF will only restore data sets which are selected, EXCLUDE statements are required only to exclude certain data sets from within a larger group on a SELECT statement, and can also be used to EXCLUDE certain tracks.

Example 1. Select all data sets with a first index of "A" except those with a second index of "B":

```

EXCLUDE DSN=A. B. * *
SELECT  DSN=A. * *

```

Example 2: Select all data set except those beginning with "SYS" on TAPE2:

```

EXCLUDE DSN=SYS* *, TAPEDD=2
SELECT  ALLDSN

```

CONTINUED . . .

## 20.08 CONTINUED . . .

**NEWNAME/  
NEWGROUP/  
NEWINDEX for  
ICF VSAM**

If you are restoring to a pre-allocated ICF VSAM cluster, where the cluster name is the same as the original, but the components may be named differently (especially if the component names were defaulted and assigned "timestamp" names prior to DFP V3), you must specify the cluster name as both DSN= and NEWNAME=; this causes DSF to LOCATE the new component names. NEWNAME cannot be specified for clusters with more than one alternate index.

If restoring an ICF VSAM cluster to a new name, if the new cluster must be allocated, you should specify NEWGROUP= or NEWINDEX=. DSF will modify both the cluster and component names. This is illustrated in [Section 20.11](#).

VSAM catalogs and VVDSs cannot be restored to a NEWNAME. DSF will properly restore a VSAM catalog even if it has been re-allocated thereby generating a new CATINDEX name.

See [Section 52.11](#) for VSAM SPECIAL CONSIDERATIONS.

<b>OPERANDS</b>	<b>DSN=</b> Specifies a fully-qualified data set name or a filter to be used for generic data set selection, as described in <a href="#">Section 52.16</a> . This name or filter will be used when scanning the names of data sets on the backup tapes to be restored.
	<b>EXAMPLES:</b> DSN=USER1. JCL. CNTL DSN= * * LI ST DSN=PROD+ . * * . LI B * DSN= does not have any special support for selecting GDGs. NOTE: The DSG= operand documented in previous versions of DSF is still accepted, but the DSN= operand with a generic data set name filter is the preferred way of selecting groups of data sets.
	<b>DD=</b> Specifies that a data set name is to be taken from a DD statement. This operand must point to the DDNAME of a JCL statement. Using this option enables the user to specify a non-standard data set name or a generation data set name. EXAMPLE:                SELECT                DD=DD1 //DD1                DD                DSN=A. B. C(O) , DI SP=SHR
	<b>ALLDSN</b> Specifies that all of the data sets dumped on the backup data set will be restored.
	<b>FROM/TO</b> Specifies an absolute track restore of the tracks identified. The values are specified in decimal, relative to zero. The alternate tracks of a volume cannot be restored. For example, valid specification on a 3380-E are CYL=0 TRK=0 through CYL=1769 TRK=14. The FROM address must not be higher than the TO address. If the FROM track is not specified, zero is assumed. If the TO track is not specified, the last track of the cylinder is assumed. Absolute track commands can be mixed with SELECT commands for data sets. The FROM and TO operands must appear on the same control record, and cannot be continued. FROM/TO can be used on an EXCLUDE command to exclude particular tracks from the restore of a data set. CAUTION: On an absolute track restore, the requested tracks will always be restored to the same absolute address they were dumped from, regardless of what data set, if any, is allocated there. The VTOC will not be updated. NOTE: DSN, DD, ALLDSN and FROM are mutually exclusive. One and only one of these operands must be specified on each restore statement. ICF VSAM NOTE: For ICF VSAM, the search is for the base cluster name. The 'SYS1.VVDS' data set will be bypassed if selected using the ALLDSN or DSN=filter operands. See <a href="#">Section 52.11</a> for further details.

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## 20.08 CONTINUED . . .

<b>BLKF=</b>	<p>Specifies that DSF is to reblock PS (fixed and variable record formats) and PO data sets. Except when restoring a PS file to a smaller disk the blocking factor must result in a larger blocksize, otherwise it will be ignored. On partitioned data sets, DSF will set the blocksize to a higher value, but will not actually reblock the members.</p> <p>BLKF= specifies a value of 1 to 10. 1 is full track blocking (max 32760), 2 half track, to 10 for a tenth of a track blocking. On fixed files DSF will round down to a multiple of the LRECL.</p> <p>Default is that DSF will not reblock data sets unless BLKF= was specified on the RESTORE statement. The restore will fail if the input data set has blocks larger than the track size of the output disk.</p>
<b>DATA=</b>	<p><b>ALL</b> -- specifies that DSF will restore the entire data set.</p> <p>ALL should not be specified unless the backup was taken using the DATA=ALL option (defaulted to in FDR), and should not be used with RLSE or %FREE.</p> <p>Default is that DSF will only restore the used tracks of PS and PO data sets, unless DATA=ALL was specified on the RESTORE statement.</p>
<b>DATACLAS=</b> <b>NULLDATACLAS</b>	<p>On a system with SMS active, specifies the SMS data class to be associated with the data set being restored, overriding the original data class of the data set (if any).</p> <p>NULLDATACLAS changes the data class to null (not specified).</p> <p>Default is that the original data class of the input data set (if any) will be associated with the output data set if it is allocated as SMS-managed.</p>
<b>DSNENQ=</b>	<p><b>NONE</b> — specifies that DSF is to bypass the data set enqueue for this data set.</p> <p>Default is the enqueue option is determined by the DSNENQ option specified on the RESTORE statement.</p>
<b>MGMTCLAS=</b> <b>NULLMGMTCLAS</b>	<p>On a system with SMS active, specifies the SMS management class to be presented to the SMS management class ACS routine for the data set being restored, overriding the original management class of the data set (if any). The ACS routine may accept or override this class.</p> <p>NULLMGMTCLAS changes the management class to null (not specified).</p> <p>Default is that the original management class of the input data set (if any) will be passed to the ACS routine for the output data set if it is allocated as SMS-managed.</p>
<b>NEWNAME=</b> <b>NEWN=</b>	<p>Specifies that DSF is to restore the data set to a new name.</p> <p>NEWNAME should only be used with DSN= or DD=, and should not be used for ICF VSAM clusters if they must be allocated.</p> <p>If the newname ends in a GDG relative generation number, e.g., NEWNAME=gdgname(—1), a LOCATE will be done to get the proper absolute generation number.</p>
<b>NEWGROUP=</b> <b>NEWG=</b>	<p>Specifies that the data sets are to be restored using a new group name. The number of characters specified will replace left to right the data set name. Care should be taken when periods are used that index levels are not incorrectly changed. DSF will check the new names for valid IBM standards.</p> <p>EXAMPLE:                SELECT     DSN=ABC* *, NEWG=XYZ</p> <p>                         Any data sets restred will be renamed</p> <p>                         starting with characters XYZ.</p>

CONTINUED . . .

## 20.08 CONTINUED . . .

**NEWINDEX=** Specifies that the data set is to be restored with one or more index levels being added or replaced in the original name. DSF will use each index level specified in **NEWI** in place of the original index level. If a period is specified without any characters preceding, DSF will copy one original index level. If + is specified, DSF will insert the characters following a plus as a new index level. If ++ is specified, DSF will add the characters following the plus-plus to the end of the original name. If — is specified, DSF will drop an index level and it's preceding period from the original name.

DSF will check the new names for valid IBM standards.

EXAMPLE: SELECTDSN=A. B. C, NEWI =XYZ. ++END

will result in the newname 'XYZ.B.C.END'

SELECTDSN=PAY. MASTER\*\*, NEWI =. TESTMAST

will result in the newname 'PAY.TESTMAST.xxxxx '.

SELECTDSN=A. B. C. D, NEWI =. - - - - X

will drop the middle two index levels and replace the last, resulting in newname 'A.X'

If the **NEWINDEX** value ends in a GDG relative generation number, e.g., **NEWI=..NEWMAST(—2)**, that relative number will be added to the end of the newname, and a **LOCATE** done to get the proper absolute generation number.

**NEWDD=** Specifies the name of a DD statement from which DSF will obtain the **NEWNAME** for the restore. NOTE: **NEWN=**, **NEWG=**, **NEWI=**, and **NEWDD=** are mutually exclusive. If none of them are specified, the data set is restored under its original name. **NEWN=** and **NEWDD=** should not be used on **SELECT** statements which select more than one data set.

**NOCAT** **RECAT** **NOCAT** specifies that DSF will not catalog any output data sets selected by this statement. This option is ignored for ICF VSAM clusters and SMS-managed data sets, since these must always be cataloged.

**RECAT** specifies that DSF should catalog non-VSAM output data sets selected by this statement even if they are currently cataloged to another volume.

Default: DSF will catalog output non-VSAM data sets unless they are currently cataloged to another volume, unless overridden by **NOCAT/RECAT** on the **RESTORE** statement.

NOTE: **NOCAT** and **RECAT** are mutually exclusive. DSF will normally only attempt to catalog output data sets which it allocates (not pre-allocated) unless the **CATIFALLOC** operand is specified.

**NVOL=** Specifies the volume serial(s) for output disk volumes to which data sets selected by this statement are to be restored. A single volume serial may be specified as **NVOL=volser** or multiple volume serials may be specified:

1) A list of volume serials may be given, enclosed in parentheses, e.g.,

NVOL=(TSO001,TSO002,TSO003)

2) A volume group may be specified by placing an asterisk at the end of the volser prefix,e.g.,

NVOL=TSO\*

3) The two may be combined, e.g., NVOL=(TSO\*,PROD\*,ABC001)

4) All online disk volumes may be selected by NVOL=\*

Volume serials which are not online will be ignored. DSF will attempt to allocate the output data sets on the first volume specified. If an allocation fails, it will be retried on the next volume in the list (in ascending device address order) until it succeeds (or until it fails on 64 volumes). If the list contains several disk device types, "like" volumes (same type as the data set being restored) will be tried first, then unlike devices.

Specifying multiple volsers or a group allows DSF to restore data sets in one pass even when no one volume has available space to contain them all.

Default is that the output volume will be selected by rules defined in [Section 20.07](#). Note than when **NVOL=** is specified, and data sets are selected which are currently allocated and cataloged, DSF will restore them to the new volumes, and not to the volume on which they are cataloged.

On a system with SMS active, **NVOL=** may be ignored if the data set does not exist on the volume specified and the data set is SMS-managed (see **STORCLAS=** below).

CONTINUED . . .

## 20.08 CONTINUED . . .

**PRESTAGE** Specifies that DSF is not to restore a data set if the output data set already exists on the selected output volume. This may be used to avoid restoring data sets which have already been restored.

Default is that DSF will restore to pre-allocated data sets, overlaying the existing contents of those data sets, unless PRESTAGE was specified on the RESTORE statement.

**RLSE** — specifies that DSF is to release all of the unused space in the output PS and PO data sets selected by this statement.

**%FREE=**

**%FREE=nn** — specifies a percentage (nn%) of the PS and PO data sets to be left free after the restore. The data sets will not be expanded in size from the original allocation of the input data set. nn may range from zero (0) which will free all of the free space (same as RLSE) to 99 which will attempt to leave the data sets with 99% free space.

Space will be released only from data sets allocated by DSF.

Default is that DSF allocates the output data sets the same size as the input data sets (unless overridden by TRK=/CYL= on the SELECT statement or by RLSE/%FREE= on the RESTORE statement).

**STORCLAS=** On a system with SMS active, specifies the SMS storage class to be presented to the SMS storage class ACS routine for the data set being restored, overriding the original storage class of the data set (if any). The ACS routine may accept or override this class.

**NULLSTOR-  
CLAS**

NULLSTORCLAS changes the storage class to null (not specified).

Default is that the original storage class of the input data set (if any) will be passed to the ACS routine for the output data set.

If the storage class ACS routine assigns a storage class to this data set, the data set will be allocated as SMS-managed.

**TAPEDD=** x — specifies the same character as specified in a TAPEX DD statement. If this operand is specified, this statement will apply only to data sets on the backup file pointed to by TAPEX.

Default is that data sets specified will be restored from any or all of the backup files specified by the TAPEX DD statements on which they are found.

**TRK=** If DSF is to allocate the data set, specifies the number of cylinders or tracks to be used for the space allocation. On PS or PO files when DATA=ALL was not specified, this value should be at least equal to the used portion of the data set. On all other types of files and when DATA=ALL is specified, this value should be equal to or greater than the original size of the file. For ICF VSAM clusters, modifies the size of the base data component only. If the space is too small for the data being restored, DSF will extend the file for non-VSAM.

**CYL=**

Default is that DSF will use the original size of the data set.

**VRECAT** Allows ICF VSAM clusters to be allocated and cataloged even if they already exist in the target ICF catalog. If the output cluster does not exist on the output volume selected, but the cluster name is in the catalog, the cataloged cluster will be scratched (by DELETE or, if that fails, DELETE NOSCRATCH). VRECAT is useful when restoring a cluster when its catalog has been restored, but the cluster on disk has not, or when restoring a cluster to a new volume. VRECAT is ignored for ICF catalogs and when the restore does not include the base data component.

Default is that ICF VSAM clusters cannot be allocated if the cluster name already exists in the catalog (even if the catalog points to the output volume) unless VRECAT was specified on the RESTORE statement.

**WARNING: VRECAT will DELETE the original cluster, with all its components, alternate indexes and PATHs, from the catalog and disks. If the DELETE fails for any reason, the DELETE NOSCRATCH may leave uncataloged components on disk.**

**20.09 DSF DUMP EXAMPLES****DUMP  
INDIVIDUAL  
DATA SETS**

DUMP by Data Set using DATA SET ENQUEUE Option. Four data sets are dumped from one disk volume to 3480 tape cartridges, referencing two by data set name and one through a DD statement. The fourth is an ICF VSAM cluster. DSF will enqueue the data sets for the duration of the dump. The backup is compressed.

```
//DUMP          EXEC   PGM=FDRDSF, REGI ON=2148K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//DI SK1        DD     UNI T=SYSDA, DI SP=OLD, VOL=SER=RVS370
//TAPE1         DD     UNI T=3480, DSN=MYTAPE, DI SP=(, KEEP)
//MASTER       DD     DSN=I AM. FI LB(O), DI SP=SHR
//SYSI N        DD     *
                DUMP    TYPE=DSF, DSNENQ=USE, BUFNO=MAX, COMPRESS=ALL
                SELECT  DSN=SYS2. LI NKLI B
                SELECT  DSN=TSO. EDI T
                SELECT  DD=MASTER
                SELECT  DSN=VSAM. CLUSTER
/*
```

Note: The performance option, BUFNO=MAX, is the default in V5.1.

**DUMP ALL  
DATA SETS**

DUMP all the data sets on two disk volumes. The VTOC and label will also be dumped. Reserve the volumes during DUMP. Only the used tracks within PS or PO data sets will be dumped. The backup is compressed.

```
//DUMPALL       EXEC   PGM=FDRDSF, REGI ON=2148K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//DI SK1        DD     UNI T=3380, VOL=SER=RES001, DI SP=SHR
//TAPE1         DD     UNI T=TAPE, DSN=DSF. BACKUP. A, DI SP=(, KEEP), VOL=(, , , 99)
//DI SK2        DD     UNI T=3390, VOL=SER=SCRO01, DI SP=SHR
//TAPE2         DD     UNI T=TAPE, DSN=DSF. BACKUP. B, DI SP=(, KEEP), VOL=(, , , 99)
//SYSI N        DD     *
                DUMP    TYPE=DSF, DSN=VTOC, ENQ=RESERVE, COMPRESS=ALL
                SELECT  ALLDSN
/*
```

**ABSOLUTE  
TRACK DUMP**

DUMP four explicitly specified ranges of tracks. The first SELECT dumps cylinder 30 in its entirety (TRK= defaulted in both FROM and TO). The second SELECT will dump to the end of cylinder 45. All cylinder and track numbers are in decimal relative to zero.

```
//DUMPTRK       EXEC   PGM=FDRDSF, REGI ON=1124K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//DI SKW        DD     UNI T=3380, DI SP=OLD, VOL=SER=A17865
//TAPEW         DD     UNI T=TAPE, DSN=MASTER, DI SP=(, KEEP)
//SYSI N        DD     *
                DUMP    TYPE=DSF
                SELECT  FROM(CYL=30), TO(CYL=30)
                SELECT  FROM(CYL=42, TRK=5), TO(CYL=45)
                SELECT  FROM(CYL=50), TO(CYL=55, TRK=7)
                SELECT  FROM(CYL=66, TRK=8), TO(CYL=402, TRK=11)
/*
```

CONTINUED . . .

## 20.09 CONTINUED . . .

**DUMP BY GENERIC NAME** DUMP all data sets whose names start with "SYS1." or whose names contain "SYSTEM" anywhere in the name. The three packs will be dumped concurrently. The VTOCs will be enqueued during the DUMP. A duplicate backup of the data sets from volume 'SYSRES' will be created.

```
//DUMP          EXEC  PGM=FDRDSF, REGI ON=3172K
//SYSPRI NT     DD    SYSOUT=*
//SYSUDUMP      DD    SYSOUT=*
//DI SK1        DD    UNI T=SYSDA, VOL=SER=MASTO1, DI SP=SHR
//TAPE1         DD    DSN=BACKUP. MASTO1, UNI T=TAPE, DI SP=(, KEEP)
//SYSPRI N1     DD    SYSOUT=*
//DI SK2        DD    UNI T=3380, VOL=SER=SYSRES, DI SP=SHR
//TAPE2         DD    DSN=BACKUP. SYSRES, UNI T=TAPE, DI SP=(, KEEP)
//TAPE22        DD    DSN=BACKUP2. SYSRES, UNI T=TAPE, DI SP=(, KEEP)
//SYSPRI N2     DD    SYSOUT=*
//DI SKA        DD    UNI T=3380, VOL=SER=SYS002, DI SP=SHR
//TAPEA         DD    DSN=BACKUP. SYS002, UNI T=TAPE, DI SP=(, KEEP)
//SYSPRI NA     DD    SYSOUT=*
//SYSI N        DD    *
                DUMP   TYPE=DSF, ATTACH, ENQ=ON, BUFNO=MAX
                SELECT DSN=SYS1. **
                SELECT DSN=**SYSTEM**
/*
```

**A VARIETY OF DATA SET DUMP COMMANDS** The following example illustrates a variety of control statements. Datasets will be dumped from three disks to tape, one at a time. All data sets beginning with "SYS" will be dumped except those with an index level beginning with "DUMP", "PAGE", or "SWAP" in their names (since the statements are scanned in sequence, the EXCLUDE must precede its related SELECT). All data sets starting with "PAY" will have all of their allocated tracks dumped. All PO data sets with a third index of "CNTL" will be selected. Additional SELECT/EXCLUDE statements up to 500 may be specified. The volume label track will be dumped from all disk volumes specified.

```
//DUMP          EXEC  PGM=FDRDSF, REGI ON=1124K
//SYSPRI NT     DD    SYSOUT=*
//SYSUDUMP      DD    SYSOUT=*
//DI SK1        DD    UNI T=3390, VOL=SER=SYSRES, DI SP=SHR
//TAPE1         DD    UNI T=TAPE, DI SP=(, CATLG), DSN=BACKUP. MASTO1
//DI SKW        DD    UNI T=SYSDA, VOL=SER=MASTO2, DI SP=SHR
//TAPEW         DD    UNI T=TAPE, DI SP=(, CATLG), DSN=BACKUP. MASTO2
//DI SKX        DD    UNI T=3380, VOL=SER=PAYRO1, DI SP=SHR
//TAPEX         DD    UNI T=TAPE, DI SP=(, CATLG), DSN=BACKUP. PAYRO1
//SYSI N        DD    *
                DUMP   TYPE=DSF, MAXCARDS=500, ENQ=RESERVE
                EXCLUDE DSN=SYS**. DUMP**
                EXCLUDE DSN=SYS**. PAGE**
                EXCLUDE DSN=SYS**. SWAP**
                SELECT  DSN=SYS**
                SELECT  DSN=PAY**, DATA=ALL
                SELECT  DSN=*. *. CNTL. **, DSORG=PO
                SELECT  FROM(CYL=0, TRK=0), TO(CYL=0, TRK=0)
/*
```

CONTINUED . . .



## 20.09 CONTINUED . . .

**DUMP FROM  
MULTIPLE  
DISKS TO  
ONE TAPE**

As the last step of an application system, it is desired to DUMP all of the data sets that have been created in this run. The data sets have been allocated non-specifically across a group of three disk volumes. All data sets which start with the index level of 'BILL' will be dumped. Also a GDG relative generation will be dumped using the DD= option. Only one tape drive will be used. Only one tape volume will be used, unless the amount of dumped data requires more; the three disks will be backed up as 3 separate GDG files on the tape.

The listings from DSF will show which data set(s) were dumped from which packs.

```
//DUMP          EXEC   PGM=FDRDSF, REGI ON=1124K, COND=(O, NE)
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//DI SK1        DD     VOL=SER=BI LLO1, UNI T=SYSDA, DI SP=SHR
//DI SK2        DD     VOL=SER=BI LLO2, UNI T=SYSDA, DI SP=SHR
//DI SK3        DD     VOL=SER=BI LLO3, UNI T=SYSDA, DI SP=SHR
//TAPE1         DD     DSN=BI LL. BACKUP1(+1), DI SP=(, CATLG),
//              UNI T=TAPE, VOL=(, RETAI N), LABEL=1
//TAPE2         DD     DSN=BI LL. BACKUP2(+1), DI SP=(, CATLG),
//              VOL=(, RETAI N, REF=*. TAPE1), LABEL=2
//TAPE3         DD     DSN=BI LL. BACKUP3(+1), DI SP=(, CATLG),
//              VOL=REF=*. TAPE2, LABEL=3
//NEWMAS T      DD     DSN=ABCD. MASTER(O), DI SP=SHR
//SYSI N        DD     *
                DUMP    TYPE=DSF
                SELECT  DD=NEWMAS T
                SELECT  DSN=BI LL. **
/*
```

NOTE: Since the three files on the tape must be created in ascending file number order, and the TAPEx files will be opened in the order that the DISKx DD statements appear, be sure that the LABEL=n JCL parameters specify the appropriate values. Since VOL=REF=\*. will copy only the last volume serial from the previous DD statement, be sure that each TAPEx DD references the preceding one which specifies the next lower file number.

**DUMP USING  
CATALOG  
AND TAPEDD**

DUMP several data sets. They may be on the same disk volume, or on separate disk volumes. Use the catalog to resolve the disk volume serials. Use TAPEDD= to ensure that each data set is backed up only once during this run. Use only one tape drive. Use only one tape volume, unless the volume of dumped data requires more.

```
//DUMP          EXEC   PGM=FDRDSF, REGI ON=2148K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//DI SK1        DD     DSN=USER. DATAA, DI SP=SHR
//DI SK2        DD     DSN=USER. DATAB, DI SP=SHR
//DI SK3        DD     DSN=USER. DATAC, DI SP=SHR
//TAPE1         DD     DSN=BACKUP. DATAA, DI SP=(, CATLG),
//              UNI T=TAPE, VOL=(, RETAI N), LABEL=1
//TAPE2         DD     DSN=BACKUP. DATAB, DI SP=(, CATLG),
//              VOL=(, RETAI N, REF=*, TAPE1), LABEL=2
//TAPE3         DD     DSN=BACKUP. DATAC, DI SP=(, CATLG),
//              VOL=REF=*. TAPE2, LABEL=3
//SYSI N        DD     *
                DUMP    TYPE=DSF, COMPRESS=ALL
                S       DD=DI SK1, TAPEDD=1
                S       DD=DI SK2, TAPEDD=2
                S       DD=DI SK3, TAPEDD=3
/*
```

**20.10 DSF PRINT EXAMPLES**

**PRINT VTOC AND VOLUME LABEL** PRINT the VTOCs and volume labels from two (2) disk volumes.

```
//PRI NT      EXEC   PGM=FDRDSF, REGI ON=1124K
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//TAPE1       DD     SYSOUT=*
//TAPE2       DD     SYSOUT=*
//DI SK1      DD     UNI T=DI SK, VOL=SER=MYDSK1, DI SP=SHR
//DI SK2      DD     UNI T=DI SK, VOL=SER=MYDSK2, DI SP=SHR
//SYSI N      DD     *
               PRI NT   TYPE=DSF, DSN=VTOC
/*
```

**PRINT INDEXED VTOC AND VVDS** PRINT the INDEXED VTOC (SYS1.VTOCIX.vvvvvv) and VVDS (SYS1.VVDS.vvvvvv) from a disk. SELTERR=NO is specified so that either of them being absent will not cause an error.

```
//PRI NT      EXEC   PGM=FDRDSF, REGI ON=1124K
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//TAPE1       DD     SYSOUT=*
//DI SK1      DD     UNI T=DI SK, VOL=SER=MYDSK1, DI SP=SHR
//SYSI N      DD     *
               PRI NT   TYPE=DSF, SELTERR=NO
               SELECT   DSN=SYS1. VTOCI X. **
               SELECT   DSN=SYS1. VVDS. **
/*
```

**PRINT INDIVIDUAL DATA SETS** PRINT all data sets which have the name of 'TEST' as the second index level.

```
//PRI NT      EXEC   PGM=FDRDSF, REGI ON=1124K
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//TAPE1       DD     SYSOUT=*
//DI SK1      DD     UNI T=DI SK, VOL=SER=MYDI SK, DI SP=SHR
//SYSI N      DD     *
               PRI NT   TYPE=DSF
               S         DSN=*. TEST. **
/*
```

**PRINT ABSOLUTE TRACK** PRINT multiple absolute track segments from a single 3390 disk volume, MYDISK. Note that the example utilizes the 'TRK' default values for the FROM and TO operands. The output report will be written to a sequential disk file.

```
//PRI NT      EXEC   PGM=FDRDSF, REGI ON=1124K
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//TAPE1       DD     DSN=DSF. REPORT, DI SP=(, CATLG), UNI T=SYSDA,
//              SPACE=(CYL, (10, 10)), DCB=BLKSI ZE=3630
//DI SK1      DD     UNI T=DI SK, VOL=SER=MYDI SK, DI SP=SHR
//SYSI N      DD     *
               PRI NT   TYPE=DSF
               S         FROM(CYL=0), TO(CYL=1, TRK=3)
               S         FROM(CYL=32, TRK=12), TO(CYL=35, TRK=6)
               S         FROM(CYL=21), TO(CYL=21)
/*
```

**20.11 DSF NON-SMS RESTORE EXAMPLES**

The following are example of DSF restores on a system which does not have SMS (System Managed Storage) active. They can also be followed on SMS systems when restoring to non-SMS-managed data sets and volumes.

**RESTORE ONE DATA SET** RESTORE one data set from a FDR or DSF backup tape. The data set will be restored, under its original name. If the data set is cataloged, it will be restored to the volume to which it is cataloged; otherwise, it will be restored to the volume it was originally dumped from. In either case, if it is not in the VTOC of that disk, it will be allocated and cataloged. If it is a PS or PO data set, only its used tracks will be restored.

```
//RESTORE EXEC PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//TAPE1 DD DSN=BACKUP. VOLUMEA, DI SP=SHR
//SYSI N DD *
        RESTORE TYPE=DSF
        SELECT DSN=MY. TEST. DATASET
/*
```

**RESTORE DATA SETS BY GROUP** RESTORE all the data sets which were dumped on the backup file specified by the TAPE1 DD statement, except for those data sets that start with an index level of 'SYS1.'. Do not restore data sets which are active. The data sets will all be restored to the volume specified by DISKx. All tracks of each data set are to be restored (the dump must also have been done with DATA=ALL). DSF will preallocate any data set not currently on the disk volume.

```
//RESTORE EXEC PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//TAPE1 DD DSN=SYSRES. BACKUP, DI SP=OLD
//DI SK1 DD UNI T=3380, VOL=SER=XXXRES, DI SP=SHR
//SYSI N DD *
        RESTORE TYPE=DSF, DATA=ALL, DSNENQ=TEST
        EXCLUDE DSN=SYS1. **
        SELECT ALLDSN
```

**RESTORE TO NEWNAME** RESTORE two data sets using NEWNAME and NEWINDEX. A data set named "LEDGER.OLDFILE" is to be renamed to "LEDGER.NEWFILE". A data set named "LEDGER.TRANSACTION" is to be restored as "LEDGER.JULY.TRANSACTION(+1)". Both will be restored to disk volume LED123. If necessary, they will be allocated and cataloged.

```
//RESTORE EXEC PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//TAPE1 DD UNI T=TAPE, DSN=BACKUP, DI SP=OLD,
// VOL=SER=12155
//SYSI N DD *
        RESTORE TYPE=DSF, RECAT
        SELECT DSN=LEDGER. OLDFI LE, NEWNAME=LEDGER. NEWNAME, NVOL=LED123
        SELECT DSN=LEDGER. TRANSACTION, NEWI NDEX=. +JULY(+1) ,
        NVOL=LED123
/*
```

**RESTORE ICF VSAM CLUSTER** Restore an existing ICF VSAM cluster from an FDR or DSF backup data set. The cluster will be restored to the volume on which it is cataloged, overlaying the existing cluster, and refreshing all associated VVDS information.

```
//RESTOREV EXEC PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//TAPEA DD DSN=FDR. BACKUP. VSAM01, DI SP=OLD
//SYSI N DD *
        RESTORE TYPE=DSF
        SELECT DSN=I CF. VSAM. CLUSTER1
/*
```

CONTINUED . . .

## 20.11 CONTINUED . . .

**RESTORE ICF  
CLUSTERS TO  
NEWNAMES**

Restore two ICF VSAM clusters from an ABR-created tape. Restore "VSAM.OLD.HISTORY" to cluster "VSAM.NEW.HISTORY" which has been preallocated; DSF will do a LOCATE to get the component names of the new cluster, and restore the equivalent original components to it. Restore cluster "PAY.MASTER" to "PAY2.MASTER" which will be allocated on an online volume whose volser starts with "PAY"; DSF will modify all of the clusters component names so that their first index is also "PAY2".

```
//RESTOREV EXEC PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//TAPEA DD DSN=FDRA BR. VXYZO10. C1002012, DI SP=OLD,
// UNI T=TAPE, VOL=SER=121777, LABEL=3
//SYSI N DD *
RESTORE TYPE=DSF
SELECT DSN=VSAM. OLD. HI STORY,
NEWNAME=VSAM. NEW. HI STORY
SELECT DSN=PAY. MASTER, NEWI =PAY2, NVOL=PAY*
/*
```

**RESTORE  
MULTIPLE  
BACKUPS**

RESTORE a group of data sets from three different backup files in the same execution of FDRDSF. All data sets with the high level index of "FILE" will be restored to online volumes whose serial starts with "TSO" or "SCR". DSF will preallocate and catalog the data sets if they do not currently exist.

```
//RESTORE EXEC PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//TAPE1 DD DSN=BACKUP. VTS0001, DI SP=(OLD, PASS),
// VOL=SER=TOO100, UNI T=TAPE
//TAPE2 DD DSN=BACKUP. VTS0002, DI SP=(OLD, PASS),
// VOL=REF=*. TAPE1, LABEL=2
//TAPE3 DD DSN=BACKUP. VTS0003, DI SP=(OLD, PASS),
// VOL=REF=*. TAPE2, LABEL=3
//SYSI N DD *
RESTORE TYPE=DSF
SELECT DSN=FI LE. **, NVOL=(TSO*, SCR*)
/*
```

**RESTORE  
MULTI-  
VOLUME DATA  
SETS AND  
CLUSTERS**

RESTORE several multi-volume data sets, including non-VSAM data sets and ICF VSAM clusters. The backups pointed to by the TAPEX DDs each contain parts of these multi-volume data sets as dumped from their original volumes. As DSF processes each backup, it will restore the pieces of each multi-volume data set it finds on that backup, allocating and cataloging them if necessary. If NVOL= is used, it must specify as least as many volumes as the data sets were dumped from. Multi-volume data sets must be restored to as many different volumes as they were dumped from. A multi-volume data set will not be usable until all pieces of the data set have been restored by DSF. [See Section 52.11](#) for Multi-Volume VSAM Considerations; there are some restrictions.

```
//RESMULTI EXEC GM=FDRDSF, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//TAPE1 DD DSN=BACKUP. VPRODO1, DI SP=OLD
//TAPE2 DD DSN=BACKUP. VPRODO2, DI SP=OLD, UNI T=AFF=TAPE1
//TAPE3 DD DSN=BACKUP. VPRODO3, DI SP=OLD, UNI T=AFF=TAPE1
//SYSI N DD *
RESTORE TYPE=DSF
SELECT DSN=NON. VSAM. MULTI O1
SELECT DSN=NON. VSAM. MULTI O2, NVOL=(TESTO1, TESTO2, TESTO3)
SELECT DSN=VSAM. MULTI O3
SELECT DSN=VSAM. MULTI O4, NVOL=TEST*
/*
```

CONTINUED . . .

## 20.11 CONTINUED . . .

**RESTORE TO 3380-K** Add data sets to a 3380-K (triple density) with DSF, in order to merge several lower density disks into one. A FDR disk-to-disk copy or a full volume restore (See Section 10) was done to move one such disk to this 3380-K. Now the contents of a 3380 single density volume can be added to the 3380-K from a FDR or DSF backup of the single density 3380. DSF will allocate space for all restored data sets and will recatalog them to the new volume (RECAT will recatalog non-VSAM data sets, and VRECAT will scratch and uncatalog any ICF VSAM clusters before allocating them on the new volume).

```
//RESTORE EXEC PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//DI SK1 DD UNI T=3380, DI SP=OLD, VOL=SER=D3380A <--- 3380-K
//TAPE1 DD DSN=BACKUP. D3380C, DI SP=OLD <--- 3380-D Backup
//SYSI N DD *
        RESTORE TYPE=DSF, RECAT, VRECAT
        EXCLUDE DSN=I CFVSAM. CATALOG1 (See Note 2)
        EXCLUDE DSN=I CFVSAM. CATALOG2 (See Note 2)
        SELECT ALLDSN (See Note 3)
/*
```

**RESTORE FROM 3380-K TO 3380 SINGLE DENSITY** RESTORE data sets from a backup of a 3380-K (triple density) to three 3380 single density volumes. DSF will allocate as many data sets as it can on the first volume specified, and the same on the second volume, and the remainder on the third volume. The data sets will be restored to the three disks in one pass of the backup tape. DSF will allocate space for all restored data sets and will recatalog them to the new volume (RECAT will recatalog non-VSAM data sets, and VRECAT will scratch and uncatalog any ICF VSAM clusters before allocating them on the new volume). This is especially useful at a disaster/recovery site, if there are not enough high-density volumes on which to do full-volume restores.

```
//RESTORE EXEC PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//TAPE1 DD DSN=BACKUP. D3380A, DI SP=OLD
//SYSI N DD *
        RESTORE TYPE=DSF, RECAT, VRECAT
        SELECT ALLDSN, NVOL=(D3380B, D3380C, D3380D) (See Note 3)
/*
```

NOTE2: A catalog should not be restored in the same execution as any data sets cataloged in that catalog. The catalog should be restored in a separate step.

NOTE3: DSF will automatically exclude the SYS1.VTOCIX, SYS1.VVDS, and the ABR model DSCB from the restore, giving the warning message FDR159 REASON=3, which may be ignored. (For the VVDS, this message will be issued even if the VVDS was not selected during the backup). If you want to avoid receiving these messages and get a cleaner listing, you should exclude them, e.g.,

```
EXCLUDE DSN=SYS1. VTOCI X. **
```

**ABSOLUTE TRACK RESTORE** RESTORE by ABSOLUTE TRACK. One track will be restored from a backup on a 3480 tape drive to a 3380 disk drive, replacing that track on the output disk. A DISKx DD statement or NVOL= operand must be provided for an absolute track restore.

```
//RESTORE EXEC PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//DI SK1 DD UNI T=3380, DI SP=OLD, VOL=SER=M33801
//TAPE1 DD UNI T=3480, DSN=BACKUP. M33801,
// VOL=SER=123456, DI SP=OLD
//SYSI N DD *
        RESTORE TYPE=DSF
        SELECT FROM(CYL=10, TRK=5), TO(CYL=10, TRK=5)
/*
```

## 20.12 DSF SMS RESTORE EXAMPLES

The following are examples of DSF restores on a system which has SMS (System Managed Storage) active. They illustrate the techniques for restoring SMS-managed data sets, or a combination of SMS and non-SMS data sets. An output data set will be SMS-managed if the SMS storage class ACS routine assigns a storage class to the data set or if it accepts the storage class passed to it by DSF. ACS routines are coded by each installation, so the decision on whether a data set is to be SMS-managed is a local one, and is usually out of the control of DSF (and the end-user).

**RESTORE  
SMS-  
MANAGED  
DATA SETS**

RESTORE a group of SMS-managed data sets from several FDR or DSF backup tapes. The data sets will retain the SMS data class that they had when dumped. Any data sets which are currently cataloged will be restored on top of their current allocation, with their original storage and management classes. For any data sets which must be allocated, their original SMS storage and management classes will be passed as input to the SMS ACS routines, which may override them; SMS will then select a storage group and a volume. If SMS assigns a null storage group (non-SMS-managed) to any data set, that data set will be restored to the volume from which it was dumped.

```
//RESTSMS      EXEC   PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//TAPE1         DD     DSN=BACKUP. SMS001, DI SP=OLD
//TAPE2         DD     DSN=BACKUP. SMS002, DI SP=OLD
//TAPE3         DD     DSN=BACKUP. SMS003, DI SP=OLD
//SYSI N        DD     *
                RESTORE TYPE=DSF
                SELECT  DSN=ABC**
/*
```

**RESTORE  
NON-SMS  
DATA SETS TO  
SMS VOLUMES**

RESTORE a group of non-SMS-managed data sets from a FDR or DSF backup tape. Any data sets which currently exist on the volume designated by DISK1 will be restored on top of their current allocation. All other data sets will be passed to the SMS ACS storage and management class routines. If SMS assigns a storage class, SMS will then select a storage group and a volume; the data sets will not have a data class. If SMS assigns a null storage group (non-SMS-managed) to any data set, it will be allocated and cataloged on the DISK1 volume.

```
//RESTSMS      EXEC   PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//TAPE1         DD     DSN=BACKUP. PROD01, DI SP=OLD
//DI SK1        DD     UNI T=3380, VOL=SER=PROD02, DI SP=OLD
//SYSI N        DD     *
                RESTORE TYPE=DSF
                SELECT  DSN=*. CI CS*. **
                SELECT  DSN=XYZ. **
/*
```

CONTINUED . . .

## 20.12 CONTINUED . . .

**VERRIDE  
SMS CLASSES**

RESTORE a data set from a FDR or DSF backup tape and request that the data set be SMS-managed; the original data set might be SMS-managed or not, but it is not currently cataloged. The values specified for STORCLAS= and MGMTCLAS= will be passed to the SMS ACS storage and management class routines, which may override them. If SMS assigns a storage class, SMS will then select a storage group and a volume. If SMS assigns a null storage group (non-SMS-managed) to the data set, it will be restored to the volume from which it was dumped (unless that volume was SMS-managed, since a non-SMS data set cannot be restored to a SMS volume).

```
//RESTSMS      EXEC   PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//TAPE1         DD     DSN=BACKUP. PRODO1, DI SP=OLD
//SYSI N        DD     *
                RESTORE TYPE=DSF
                SELECT   DSN=PROD. MASTER. FI LE, DATACLAS=MASTER,
                        MGMTCLAS=PERM, STORCLAS=PROD2
/*
```

**RESTORE TO  
NON-SMS  
VOLUME**

RESTORE a data set from a FDR or DSF backup tape and request that the data set be non-SMS; the original data set might be SMS-managed or not. NULLSTORCLAS specifies that a null value will be passed to the SMS ACS storage class routine, which may override it. If SMS honors the null storage group, it will be restored as non-SMS on the volume TSO123; no SMS classes will be associated with it. If SMS assigns a storage class, SMS will then select a storage group and a volume.

```
//RESTSMS      EXEC   PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//TAPE2         DD     DSN=TEST. BACKUP. SMS123, UNI T=TAPE,
//              VOL=SER=BOO123, DI SP=OLD
//SYSI N        DD     *
                RESTORE TYPE=DSF, RECAT
                SELECT   DSN=USER01. I SPF. I SPPROF, NULLSTORCLAS, NVOL=TSO123
/*
```

**BYPASS ACS  
ROUTINES**

An authorized user (such as a storage administrator) may need to bypass the SMS ACS routines, to force a data set to be SMS-managed or non-SMS-managed, and to specify the SMS classes to be used. In the example, TEST.DATASET1 will be assigned the specified SMS classes; SMS will then select a storage group and a volume. TEST.DATASET2 will be assigned a null storage class, so it will be allocated as non-SMS on the volume indicated by DISK1. See the description of the BYPASSACS operand in [Section 20.07](#) for authorization requirements.

```
//RESTSMS      EXEC   PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//TAPE1         DD     DSN=BACKUP. TEST01, DI SP=OLD
//DI SK1        DD     UNI T=3390, VOL=SER=TEST03, DI SP=OLD
//SYSI N        DD     *
                RESTORE TYPE=DSF, BYPASSACS
                SELECT   DSN=TEST. DATASET1, MGMTCLAS=TESTDS, STORCLAS=TEST
                SELECT   DSN=TEST. DATASET2, NULLSTORCLAS
/*
```

CONTINUED . . .

## 20.12 CONTINUED . . .

**BYPASS SMS  
ALLOCATION**

An authorized user (such as a storage administrator) may need to force the allocation of SMS-managed data sets onto specific volumes; normal SMS facilities do not allow you to do so, but DSF does. Each data set selected will be passed to the SMS storage and management class ACS routines; each data set to which SMS assigns a storage class will be allocated and cataloged on the volume indicated by DISKA; this volume **MUST** be a SMS-managed volume. Any data set which does not get a storage class assigned will not be restored, since only SMS data sets may be allocated on a SMS volume. See the description of the BYPASSSMS operand in [Section 20.07](#) for authorization requirements.

```
//RESTSMS      EXEC   PGM=FDRDSF, REGI ON=1024K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//TAPEA         DD     DSN=BACKUP. DEVEL. FI LES, DI SP=OLD
//DI SKA        DD     UNI T=DI SK, VOL=SER=SMS123, DI SP=OLD
//SYSI N        DD     *
                RESTORE TYPE=DSF, BYPASSSMS
                SELECT  DSN=DEVEL**
/*
```

**Note:** BYPASSACS and BYPASSSMS may be used together. If so, any data set which was originally SMS-managed or which has an SMS storage class specified by STORCLAS= will be directly allocated and cataloged as SMS-managed on the designated DISKx SMS-managed volume.



**20.13 DSF UNLIKE DEVICE EXAMPLES**

DSF can restore most types of data sets to a “unlike” disk device using a “logical” restore; for example, 3380 data sets can be restored to 3390 disks. Logical restore is automatically invoked when the output device type of a given data set differs from the type of disk backed up. Special Considerations can be found in [sections 52.11, 52.14, and 52.15](#), and in member UNLIKE in the FDR ICL (Installation Control Library). For ICF VSAM in particular, refer to member VSAMUNLK in the ICL for considerations on restoring clusters to smaller disks (3390 to 3380). Most of the examples in the preceding sections will work even if the output disk type is different from the type of disk backed up. Following are some specific unlike restore examples.

**RESTORE  
DATA SETS  
TO 3390**

RESTORE data sets from a FDR, DSF or ABR backup of a 3380 disk to a 3390 disk. The data sets will be restored under their original names and will be cataloged to the output volume. All data sets will retain their original blocksizes; they will be allocated with a size about equal in bytes to the original 3380 data set. The selected data sets may include ICF VSAM clusters and non-VSAM data sets.

```
//UNLI KE      EXEC   PGM=FDRDSF, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TAPE1        DD     DSN=BACKUP. D3380A, DI SP=SHR
//SYSI N       DD     *
                RESTORE TYPE=DSF, RECAT, VRECAT
                SELECT  DSN=TEST. **, NVOL=D3390X
/*
```

**RESTORE  
DATA SETS  
TO 3380**

RESTORE data sets from a FDR, DSF or ABR backup of a 3390 disk to several 3380 disks (volsers starting with “D3380”). The data sets will be restored under their original names and will be cataloged to their output volume. All PS (sequential) data sets will be reblocked to half-track blocking for maximum track utilization.

```
//UNLI KE      EXEC   PGM=FDRDSF, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TAPE1        DD     DSN=BACKUP. D3390X, DI SP=SHR
//SYSI N       DD     *
                RESTORE TYPE=DSF, RECAT, BLKF=2
                SELECT  DSN=TEST. **, NVOL=D3380*
/*
```

CONTINUED . . .

## 20.13 CONTINUED . . .

**RESTORE  
ENTIRE 3380  
TO 3390**

RESTORE all data sets from a backup of a 3380 disk to several 3390 disks. In most cases, all the data sets on a 3380 fit on a 3390-2, but multiple 3390 output volumes are provided in case there is not room. All data sets will be restored under their original names and will be cataloged to their output volume. All PS (sequential) data sets will be reblocked to half-track blocking for maximum track utilization; PO data sets will have their blocksize increased to half-track for new members. The selected data sets may include ICF VSAM clusters and non-VSAM data sets. ICF VSAM clusters will be cataloged into the catalog indicated by the alias in the master catalog (by default, DSF would attempt to catalog them in their original catalog).

```
//UNLI KE      EXEC   PGM=FDRDSF, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TAPE1        DD     DSN=BACKUP. D3380X, DI SP=SHR
//SYSI N       DD     *
                RESTORE TYPE=DSF, RECAT, VRECAT, BLKF=2, I CFCAT=ALI AS
                SELECT   ALLDSN, NVOL=(D3390A, D3390B, D3390C)
/*
```

**RESTORE  
SMS-  
MANAGED  
DATA SET**

RESTORE a data set and request that the data set be SMS-managed; if SMS allocates the data set on a different disk type from its original type, a logical restore will automatically be done; if it is the same device type, a physical restore will be done.

```
//SMSUNLK      EXEC   PGM=FDRDSF, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TAPE1        DD     DSN=BACKUP. PRODO1, DI SP=OLD
//SYSI N       DD     *
                RESTORE TYPE=DSF
                SELECT   DSN=PROD. MASTER. FI LE, STORCLAS=PROD2
/*
```

**21.01 FDRCOPY TECHNICAL DESCRIPTION**

**OVERVIEW** The FDRCOPY program provides the ability to copy or move data sets directly from one disk to another, without an intervening backup. In a COPY operation the input data set remains on disk; in a MOVE operation the input data set is **deleted**.

In most respects a COPY operation with FDRCOPY is similar to a DUMP with FDRDSF followed by a RESTORE, except that no backup file is involved.

FDRCOPY can copy or move individual data sets, groups of data sets, or all of the data sets on a volume. Data sets can be selected or excluded by DSORG. Absolute tracks can also be copied. Data sets can be copied or moved to the same name or to a new name. An unlimited number of data sets can be copied or moved in one execution. Data sets may be copied or moved from any number input disk volumes, and output datasets may be directed to any number of output disk volumes. The output volume may be a different device type from the input disk volume.

FDRCOPY will allocate space for the output data set if it does not already exist on the output volume, and if requested (or by default on MOVE) will recatalog the data set to point to the new volume.

FDRCOPY can be used to convert datasets to SMS (System Managed Storage) or back to non-SMS.

FDRCOPY can also be used to reorganize (compress) PDSs in place, either by itself or in conjunction with FDRREORG, the reorganization component of FDR.

**PDS  
REORGANI-  
ZATION**

FDRCOPY can reorganize PDSs (Partitioned Data Sets) in place, compressing all active members to the beginning of the PDS to allow room for new members to be added. This is similar to a IEBCOPY compress-in-place, but FDRCOPY is 50% to 90% faster than an equivalent IEBCOPY, with similar reductions in CPU and I/O resources. FDRCOPY is capable of reorganizing many PDSs on one or many volumes in one step, with just a few simple control statements. PDSs to be processed may be selected from specified volumes or selected from system catalogs, using all of the selection criteria of FDRCOPY (except that only DSORG=PO data sets will be selected).

FDRCOPY PDS REORG may be automatically invoked to process IEBCOPY compress-in-place operations without any changes to the JCL and control statements for IEBCOPY. ([Section 92.65](#))

PDS reorganization is requested by the REORG command, as described in [Section 21.20](#).

**However, the REORG function is enabled only if your installation is licensed for FDRREORG, a separately-priced component of FDR.**

FDRCOPY also supports simulation of PDS reorganization, via the SIMREORG control statement. SIMREORG must still read the PDSs but will only simulate rewriting the data, reporting on the number of tracks that will be reclaimed by a real REORG.

FDRREORG ([See Section 25](#)) reorganizes VSAM data sets, IAM (Innovation Access Method) data sets, and PDSs (using FDRCOPY for the PDS reorganization). If you execute PDS reorganization through FDRREORG, it enhances the reorganization process by providing additional selection criteria and retrying unavailable datasets, among others. However, these enhancements may add additional overhead; executing FDRCOPY REORG directly will provide the fastest PDS reorganization.

**SPECIFYING  
DATA SETS TO  
BE  
COPIED OR  
MOVED**

FDRCOPY copies or moves user-specified data sets from one or more input disks to one or more output disks. The data sets to be processed can be specified by individual name, or groups of datasets may be selected using a generic data set name filter, or the ALLDSN operand may be used to copy or move all of the data sets on a volume. The datasets may be selected by scanning the VTOCs of volumes specified by the user, or datasets may be selected from system catalogs. Data sets can be selected or excluded by DSORG.

The NEWNAME/NEWGROUP/NEWINDEX/NEWDD operands can be used to specify different names for the output data sets; if not, the data sets will be copied or moved to the same names. (For VSAM, on a COPY, the output data set either must have a different name or must be cataloged in a different catalog; on a MOVE the output data set may have the same name.)

CONTINUED . . .

## 21.01 CONTINUED . . .

**CREATING  
OUTPUT  
DATA SETS**

FDRCOPY will search the VTOC of the selected output volume to see whether the output data set name already exists there. If so, FDRCOPY will overlay the existing data set (unless the PRESTAGE operand is specified). If not, FDRCOPY will allocate space for the output data set. If FDRCOPY allocates the data set, it will allocate the same amount of space that is allocated to the input data set, unless the operands RLSE or %FREE= request a smaller amount, or the CYL= or TRK= operands request a larger amount. Unless the data set is marked as unmovable (e.g. DSORG is PSU), it may be allocated anywhere on the output volume.

If the data set exists on the output volume before the copy or move, FDRCOPY will overlay the existing data. For VSAM clusters, each component of the output cluster must be as large or larger than the equivalent input component. For non-VSAM, if the output data set is too small, FDRCOPY will allocate an additional extent of the required size, if possible.

**CATALOGING  
NON-VSAM  
OUTPUT  
DATA SETS**

For single-volume non-VSAM non-SMS data sets:

On a COPY, if FDRCOPY allocates space for the output data set, then the default is that FDRCOPY will catalog the data set to the output volume, unless the data set was already cataloged. (For a copy to the original name, if the input data set is cataloged, the output data set will not be cataloged).

On a MOVE the default is that if FDRCOPY allocates space for the output data set, then FDRCOPY will catalog the data set to the output volume unless the data set was cataloged to a volume other than the input volume before the operation. (For a move to the original name, if the input dataset is cataloged to the input volume, it will be recataloged to the output volume).

If the RECAT operand is specified for either COPY or MOVE then FDRCOPY will always catalog the data set to the output volume.

If the NOCAT operand is specified, on either a MOVE or a COPY, then FDRCOPY will not catalog the output data set.

Cataloging or recataloging of non-VSAM data sets occurs at the end of the MOVE or COPY, and is bypassed if any errors have occurred for a given data set.

If the output data set exists on disk before the move or copy, then FDRCOPY will not update the catalog, unless the CATIFALLOC operand is specified.

STEPCAT is supported; if present, only the STEPCAT catalog (or the first catalog in the STEPCAT concatenation) will be searched or updated.

Since SMS-managed datasets are always cataloged, a copy/move to a SMS dataset will fail if the above rules do not catalog the output data set.

**NOTE: If an FDRCOPY run is interrupted by an ABEND or system crash, then the output data sets will be left on disk, but will not be cataloged. When the run is resubmitted, CATIFALLOC must be specified if the output data sets are to be cataloged.**

For multi-volume non-VSAM data sets, the above rules for single-volume data sets apply, with the following modifications:

If the data set is not already cataloged (e.g. on a MOVE or COPY to a new name), FDRCOPY will create a new multi-volume catalog entry with the current output volume in the proper slot as indicated by the volume sequence number in the DSCB. If the volume sequence number is higher than 1, FDRCOPY will fill in the preceding slots in the catalog entry with a dummy volume serial of "#####nn".

If the data set is already cataloged (e.g. on a move to the original name), FDRCOPY will update the catalog entry by putting the current output volume into the proper slot as indicated by the volume sequence number in the DSCB. On a COPY without RECAT, FDRCOPY will update the catalog entry only if the slot for this output volume contains the dummy volume serial of "#####nn"; otherwise a warning message will be issued. On a MOVE without RECAT, FDRCOPY will update the catalog entry only if the slot contains the serial number of the input volume, or the dummy volser "#####nn".

Thus, when doing a MOVE, or a COPY with RECAT, of a cataloged multi-volume data set to the same name, the resulting data set and catalog entry will be usable and correct, whether the data set is moved from one, some, or all of its original volumes. When doing a MOVE or COPY of a cataloged multi-volume data set to a new name, it will be necessary to move or copy the data set from all of its volumes to get a usable data set and catalog entry. If a multi-volume data set is being moved/copied to a new device type, it will not be usable until all pieces are on the same device type.

CONTINUED . . .

## 21.01 CONTINUED . . .

**DELETING  
THE INPUT  
DATA SET**

At the end of a MOVE operation, the input data sets are deleted. Deletion is bypassed for a given data set if any errors have occurred for that data set.

For a multi-volume data set, only the portion on the current input volume will be deleted. Portions on other volumes will remain on disk, unless they are also MOVED.

FDRCOPY will not delete multi-volume VSAM data sets.

On a COPY operation, the input data set remains on disk (although the catalog is updated to point to the output data set, if the RECAT operand is specified and the output data set has the same name).

**WHAT  
FDRCOPY  
COPIES OR  
MOVES**

As a default, FDRCOPY will copy or move up to the last block pointer (end-of-file) on PS and PO data sets.

FDRCOPY fills in the Format 1 and 2 DSCBs on the output disk with the information from the DSCBs on the input disk. See "What DSF Restores in the DSCB" in [Section 52.04](#) for details. An exception to [Section 52.04](#) is that on a MOVE, the creation date and last reference date are copied from the input data set. On a COPY, as on a RESTORE, the creation date is retained as it was on the output volume before the COPY (i.e. today's date, if the output data set was created by the COPY), and the last reference date is set to today's date.

**ABSOLUTE  
TRACK  
ADDRESS  
OPTION**

If the user specifies physical track starting and ending addresses, FDRCOPY will COPY the requested physical segment from the input volume to the same physical location on the output volume. This operation will not update the VTOC on the output volume to reflect the data sets that have been affected.

A MOVE operation for absolute track addresses will be treated as a COPY. Since the operation is not associated with a data set, there is no input data set to delete.

Extreme caution should be used when copying tracks within the VTOC, VTOC index, or VVDS, or the volume label track, since an error may make data sets or the entire pack unusable.

**ICF VSAM  
SUPPORT**

FDRCOPY supports ICF VSAM files using the base cluster name. FDRCOPY will copy or move all of the components associated with the cluster on a volume, including alternate indexes and key ranges. In addition FDRCOPY will copy or move the VVR information found in the VVDS. An ICF VSAM cluster can be selected by individual name or as part of a data set group, or will be included when the ALLDSN operand is used to copy or move all of the data sets on a volume. If the output cluster does not exist on disk before the copy or move, then FDRCOPY will allocate space for it by invoking SVC 26 to do a DEFINE.

When FDRCOPY does a DEFINE for VSAM, some of the information that exists only in the catalog will be copied from the input cluster, including candidate volumes, expiration date, owner ID, and passwords and other VSAM security fields. The creation date will be copied on a MOVE operation; on a COPY operation the creation date of the output cluster will be the run date. If the input cluster is protected by a discrete RACF profile, then the output cluster will also be protected by a discrete RACF profile, which will be created by using the profile of the input cluster as a MODEL, unless the input profile does not actually exist, which will cause the output cluster to be created with no discrete profile. Path names for alternate indexes will not be copied or moved; the user must reestablish path names by IDCAMS DEFINE PATH after the copy or move.

For VSAM, all data sets must be cataloged; the NOCAT, RECAT, and CATIFALLOC operands are ignored.

FDRCOPY copies track by track; the cluster is not reorganized.

[See Section 52.11](#), VSAM Special Considerations, for further details.

CONTINUED . . .

**ICF VSAM —  
MOVE**

A MOVE operation for a VSAM cluster can use either the same name or a new name. On a MOVE to the original name, FDRCOPY will temporarily DEFINE the output cluster with an inserted index level of “.Txxxx”, where xxxx is a timestamp consisting of four hexadecimal digits. “.Txxxx” will be inserted as the next-to-last index level of the temporary name for the output cluster and for each of its components. If the original name is longer than 38 characters, characters will be removed from the original name as necessary, preceding the point of insertion. If these temporary names would violate your installation naming standards, please contact INNOVATION for assistance.

At the end of a MOVE, if no errors have been encountered, FDRCOPY will DELETE the input cluster. If the MOVE was to the original name, FDRCOPY will then ALTER the names of the output cluster and its components back to the original names.

If errors are encountered during a MOVE, before the input cluster is deleted, FDRCOPY will attempt to DELETE the output cluster; if it is successful, no action is required and the input cluster is unchanged. If it fails, then both the input cluster and the output cluster will remain on disk and you will need to manually clean up:

- If the MOVE was to the original name, then the output cluster will have the temporary name. If the move is re-attempted, a new output cluster will be created with a different timestamp in its temporary name. After the earlier output cluster is no longer needed for investigation of the error, you should DELETE it with IDCAMS.
- If the MOVE was to a new name, then the output cluster will have the new name. If the MOVE is re-attempted, FDRCOPY will find and reuse the earlier output cluster.
- If errors are encountered during a MOVE, while the input cluster is being deleted, then the input cluster may or may not still be on disk, as indicated by the error codes, and the output cluster will be on disk. If the MOVE was to the original name, then the output cluster will have the temporary name. You can use IDCAMS DELETE and ALTER to clean up this condition.

If errors are encountered during a MOVE to the original name, while the output cluster is being renamed, then the input cluster will be gone, and the output cluster will remain on disk; some parts of the output cluster may have been renamed to the original name. You can use IDCAMS ALTER to clean up this condition.

A MOVE of a multi-volume ICF VSAM cluster is not supported. A MOVE of a KSDS with keyranges can only be done to a new name.

**ICF VSAM —  
COPY**

A COPY operation for a VSAM cluster must always specify either a new name for the output cluster and all its components, or a different catalog (ICFCAT=). The reason is that all ICF VSAM files are cataloged as soon as they are created, and there cannot be two catalog entries for the same cluster name in the same catalog.

A COPY of a multi-volume ICF VSAM cluster is supported in most cases. [See Section 52.11](#) for Multi-Volume VSAM Considerations.

**ICF VSAM —  
NEW NAMES**

When the user wishes to copy or move an ICF VSAM data set to a new name, the NEWINDEX or NEWGROUP operand should usually be used rather than the NEWNAME operand. NEWNAME specifies a new name for the cluster but causes FDRCOPY to allow the VSAM to generate names for the components; with NEWINDEX or NEWGROUP, the specified changes are applied to all component names as well as to the cluster name.

- BCS** FDRCOPY cannot copy or move an ICF VSAM catalog (BCS), because an ICF VSAM catalog cannot be copied or moved to a new name, even temporarily.

CONTINUED . . .

**21.01 CONTINUED . . .**

**VVDS** FDRCOPY cannot copy or move a VVDS (VSAM Volume Data Set, SYS1.VVDS.Vserial) as an entity. Instead, FDRCOPY updates the VVDS on the output volume to reflect the attributes of the clusters that have been copied or moved.

**MEMORY REQUIREMENTS** Most FDRCOPY jobs will run in a region of 2000K. If a very large number of data sets or VSAM clusters are to be processed, more storage may be required. Some logical copy operations may also require additional memory. FDRCOPY memory requirements are fixed for a given function; if too large a region is provided FDRCOPY will not make use of the excess memory, but it will fail if too small a region is given. So, we recommend that you specify as large a region as possible (REGION=0M will allocate the largest possible region).

On XA/ESA systems, some FDRCOPY functions use memory above the 16mb line. The normal default region of 32M above the line is usually adequate, but if your default is smaller or more is required, specify a larger value (e.g., REGION=64M allocates 64MB above the line and the largest possible region below).

**CONTROL STATEMENTS** The first FDRCOPY statement must be a COPY, MOVE, REORG, or SIMREORG statement, specifying TYPE=DSF plus other optional operands, to indicate the function to be performed. Following that must be one or more SELECT statements (plus optional EXCLUDE statement) to indicate the data sets to be processed.

FDRCOPY, as the default, will accept up to 250 control statements in a single execution. A keyword (MAXCARDS=) is provided to increase this limit. You may need to specify MAXCARDS= if CATDSN= is used to select data sets from the catalog, since CATDSN creates a simulated SELECT statement entry for each data set.

An unlimited number of data sets may be selected by a given execution of FDRCOPY by DSN=filter or CATDSN=filter or ALLDSN (also see Memory Requirements, above).

FDRCOPY will copy, move or reorganize from all input disk volumes specified by DISKx DD statements. In addition, any online disk volumes specified by VOL= operands on SELECT statements (or selected from the catalog by CATDSN=) that are not represented by a DISKx DD statement will be dynamically allocated and processed, so DISKx DD statements are not required by FDRCOPY. Input volumes will be processed one at a time. Volumes on DISKx DDs will be processed first, in the order they appear, and dynamically allocated disk volumes will be processed in ascending device address order.

The output volume for each dataset will be determined by rules detailed in [Section 21.03](#); if necessary, output volumes will be dynamically allocated by FDRCOPY. Datasets selected from one input volume may be output to multiple disks concurrently. Output volumes are not used for PDS reorganization.

If any data sets requested by control statements do not exist on the input volumes, FDRCOPY will continue to copy or move the remainder of the data sets. Error messages will be printed for the data sets that were missing. A U0888 ABEND will be issued at the end of the jobstep, unless the operand SELTERR=NO is specified.

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**21.01 CONTINUED . . .****DIAGNOSTIC  
PROCESSING**

FDRCOPY reports any discrepancies it detects in the VTOC or on the disk itself. Errors detected in a VTOC may prevent a COPY or MOVE by data set. FDRCOPY depends on the disk VTOC to establish the characteristics of the data set(s); for this reason FDRCOPY attempts to determine the integrity of the VTOC before it begins processing.

If any data sets encounter physical or logical errors during the operation, FDRCOPY will continue to process the remainder of the data sets. Error messages will be printed for the data sets in error, and a U0888 ABEND will be issued at the end of the jobstep. For a COPY or MOVE, the output dataset will be scratched if possible and the input dataset will remain undisturbed. Errors during a REORG may leave the dataset in an unusable state.

If the maximum number of physical I/O errors is exceeded for a given input volume, then the current FDRCOPY operation on that volume will terminate immediately. FDRCOPY will continue with the next input volume, if any. Any datasets in progress on the aborted input volume may not be completed (even if they had no errors); output datasets will not be scratched, no cataloging will be done. The maximum number of errors defaults to 20; the MAXERR= operand can be used to set a different maximum.

Warning messages are always provided by FDRCOPY during any ABSOLUTE TRACK COPY in which data is written within the VTOC or volume label track of the receiving disk pack.

FDRCOPY always indicates successful completion with an FDR999 message and a list of the data sets it processed.

**ALTERNATE  
DEVICE  
SUPPORT**

FDRCOPY can copy or move datasets to a new device type.

A copy/move to different models of the same device type is a "like" device operation, treated the same as a copy/move to the original device and model, as long as the output volume has sufficient space to hold the datasets being output. For example, a data set can be copied or moved from any 3380 to any 3380 single, double (3380-E) or triple (3380-K) density disk, or any 3390 in 3380 compatibility mode; any 3390 native mode data set can go to a single (3390-1) or double (3390-2) or triple (3390-3) density disk.

FDRCOPY can also copy/move datasets from one device type to a totally different type of disk (an "unlike" device) using a logical copy. For example, datasets can be copied from a 3380 (any model) to a 3390 (any model). Datasets can be copied from one input disk to both like and unlike devices concurrently. The logical copy occurs automatically when FDRCOPY detects the different device type or when reblocking is requested.

Logical copy/move supports most data set organizations (DSORGs) including PS (physical sequential), PO (partitioned), DA (direct), KSDS (ICF VSAM keyed), ESDS (ICF VSAM sequential), RRDS (ICF VSAM relative record), and LDS (ICF VSAM linear). When allocating datasets on an unlike device, FDRCOPY will allocate an amount of space roughly equivalent to the size of the input dataset in bytes. Pre-allocated datasets must be allocated with this same space.

Details on how physical and logical copy handle each type of dataset are in [Section 52.15](#). More detail on copy to different device types is in [Section 52.14](#).

**CACHE  
SUPPORT**

FDRCOPY, if executed on a disk device which is connected to a caching control unit such as the 3990 model 3, will automatically avoid loading any new tracks into the cache for either the input volume or the output volume. Tracks currently in the caching buffer belonging to other data sets will not be disturbed. Tracks in the buffer that belong to the data sets being copied or moved will be read from cache for the input volume and written to both cache and DASD for the output volume.

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## 21.01 CONTINUED . . .

**OUTPUT  
VOLUME  
SELECTION**

While processing the datasets selected from a given input disk volume, FDRCOPY can copy/move them to one or more disk volumes concurrently. The target disk volume will be selected for each dataset by the following rules:

- \* If the NVOL= operand was specified on the SELECT statement which selected this dataset, that volume or volumes will be used. If NVOL= specified more than one volume serial, the first of those volumes will be selected; allocation may be attempted on up to 64 of those volumes in turn until it is successful. If the NVOL list includes more than one type of disk device, those with the same type as the input dataset ("like" devices) will be tried first. Any volumes in the NVOL list which are not online will be ignored.
- \* If the input volume being processed was specified by a DISKx DD statement in the FDRCOPY JCL, and there is a matching TAPEx DD pointing to a disk volume, then the disk to which it points will be selected for output.
- \* If the output dataset name (the original name, or the newname if the NEWNAME=, NEWGROUP=, or NEWINDEX= operand was specified on the SELECT statement which selected the dataset) is cataloged, then the volume to which it is cataloged will be chosen. If the dataset is cataloged as being on multiple volume serials, then the volser will be selected from that list based on the volume sequence number in the F1 DSCB (field DS1VOLSQ) of the input dataset.
- \* If none of the above apply, then the dataset will be copied or moved to the input volume. However, any attempt to copy or move a dataset back on top of itself will be rejected.

If SMS (System Managed Storage) is active on this system, and the dataset does not already exist on the volume selected by the rules above, SMS is invoked to decide if the dataset should be SMS-managed. If so, SMS will select an output volume. SMS rules are detailed in the following text.

**NO DUPLI-  
CATE TAPE  
OPTION**

Unlike the full-volume COPY command of program FDR, the FDRCOPY program does not have the option to create a duplicate backup copy on tape. No backup will be created by a REORG function.

**DATA SET  
ENQUEUE  
OPTION**

For every data set that is to be processed, FDRCOPY will test whether the data set is in use, unless the operand DSNENQ=NONE is specified. A data set is considered to be in use if any job in the system, other than this FDRCOPY, has a DD statement or dynamic allocation referencing the data set, with any disposition (OLD, MOD, SHR, or NEW). If a data set is found to be in use, an error message will be issued. Any data set that is found to be in use will not be processed, unless the operand ENQERR=PROCESS is specified. If any data set was found to be in use, a U0888 ABEND will be issued at the end of the jobstep, unless the operand ENQERR=NO is specified.

You should not specify DSNENQ=NONE or ENQERR=PROCESS unless you are certain that the data sets involved are not actively in use. For example, when processing a duplicate SYSRES volume the data sets may appear to be in use because the system is using data sets by the same name on another volume.

ENQERR=PROCESS and ENQERR=NO are not mutually exclusive; either or both of these operands may be specified. For any data that is not found to be in use, FDRCOPY will lock up (ENQ) the data set during the execution of the copy or move, unless the operand DSNENQ=TEST (or DSNENQ=NONE) is specified. Output datasets allocated by FDRCOPY will not be enqueued.

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**21.01 CONTINUED . . .****SMS  
SUPPORT**

On a system with IBM's SMS (System Managed Storage) active, FDRCOPY supports copying and moving SMS-managed datasets, and conversion of non-SMS datasets to SMS management and back again.

When processing input datasets which are SMS-managed, FDRCOPY will extract SMS information from the VVDS and VTOC for both VSAM and non-VSAM datasets. This includes SMS class information (storage, management, and data classes), and SMS indicators.

When output datasets must be allocated on a SMS system, SMS will be invoked for every such dataset, to decide if the dataset should be managed by SMS, or allocated as non-SMS. The SMS storage class and management class ACS (Automatic Class Selection) routines will be invoked; they will be passed input class names:

- \* if the user specified STORCLAS=, NULLSTORCLAS, MGMTCLAS=, or NULLMGMTCLAS, those overriding values will be used.
- \* if the storage class or management class (or both) were not overridden by the user, the class associated with the input dataset will be used (if the input dataset was not SMS-managed, a null class will be passed).

The ACS routines may accept those classes, or override them with different values or even null values.

If SMS assigns a storage class to a dataset, it will be SMS-managed; SMS will be invoked again to allocate the dataset on a volume chosen by SMS. If no storage class is assigned, FDRCOPY will allocate the dataset on a non-SMS volume (a target non-SMS volume must be indicated by a TAPEX DD statement or a NVOL= operand on the SELECT statement). Even if datasets are allocated by SMS on a number of different volumes, FDRCOPY will output those datasets in one pass of the input volume.

So, FDRCOPY can be used to convert datasets to SMS management, simply by updating the SMS ACS routines to assign storage classes to the output datasets, or by specifying a storage class via the STORCLAS= operand on the SELECT statement. Datasets can be converted back to non-SMS if the ACS routines assign no storage class or if the NULLSTORCLAS operand is specified. FDRCOPY can also be used to move SMS-managed datasets to new volumes if the SMS storage groups are redefined.

Storage administrators, with proper authority, can override or bypass many of the SMS functions, to directly specify SMS classes, or to specify the volume serial on which SMS datasets are to be placed, by use of the BYPASSACS and BYPASSSMS operands on the COPY/MOVE statement.

More detail on SMS support is in [Section 52.50](#).

**21.03 FDRCOPY JOB CONTROL REQUIREMENTS**

To execute FDRCOPY, the following JCL statements are required:

**JOB  
STATEMENT**

The JOB Statement is user-specified and depends on installation standards.

**STEPLIB or  
JOBLIB DD**

If required, specifies the load library in which FDRCOPY resides. The library must be APF authorized.

**EXEC  
STATEMENT**

Specifies the program name (FDRCOPY), region, and PARM field. A region of 2M is adequate for most FDRCOPY functions (see "Memory Requirements" in [Section 21.01](#)). If a PARM is specified, FDRCOPY will use data specified as the first control statement, which must be a valid COPY, MOVE, REORG, or SIMREORG statement; if the PARM data contains a slash (/), the data after the slash will be used as the second control statement (usually a SELECT). If FDRCOPY is invoked from a user program, Register 1 must follow IBM's convention for the PARM field.

**SYSPRINT DD  
STATEMENT**

Specifies an output message data set. Must be present. Usually a SYSOUT data set. SYSPRINT will receive messages from the restore (output) side of the copy/move/reorg, and will also receive messages from the dump (input) side if SYSPRINx DD statements are not provided.

**SYSPRINx DD  
STATEMENT**

Specifies an output message data set. If input disks have been specified by optional DISKx DD statements, you may optionally provide a SYSPRINx for each DISKx DD in the step. Usually a SYSOUT data set. SYSPRINx will receive messages from the dump (input) side of FDRCOPY, but these messages will go to SYSPRINT if SYSPRINx is omitted (in this case, some non-essential dump messages will be omitted).

**SYSUDUMP DD  
STATEMENT**

Specifies the ABEND dump data set. Usually a SYSOUT data set. A SYSUDUMP DD statement should always be included to assist in error diagnosis.

**DISKx DD  
STATEMENT**

Optionally specifies the unit, volume serial and disposition of an input disk volume (or a volume containing PDSs to be reorganized).

Example:

```
//DI SK1          DD          UNI T=SYSDA, VOL=SER=DI SK01, DI SP=OLD
```

x may specify any valid alphanumeric character (0-9, A-Z). If DUMMY is specified this DD statement will be ignored. Only one disk volume serial can be specified on a DISKx DD.

FDRCOPY will process all disk volumes specified by DISKx statements in the FDRCOPY step; however, any disk volumes identified by VOL= operands on SELECT statements, or selected from the catalog by CATDSN= will be automatically dynamically allocated by FDRCOPY if there is no DISKx DD statement for them, so DISKx DDs are not required.

**TAPEx DD  
STATEMENT**

Optionally specifies the unit, volume serial and disposition of an output disk volume.

Example:

```
//TAPE1          DD          UNI T=SYSDA, VOL=SER=DI SK02, DI SP=OLD
```

x may specify any valid alphanumeric character (0-9, A-Z) and must match a DISKx DD statement in the FDRCOPY step. TAPEx will be ignored if there is no DISKx DD statement, or if it specifies DUMMY. Only one disk volume serial can be specified on a TAPEx DD.

Although TAPEx DDs are optional, if present they specify a default target output volume for datasets moved or copied from the disk volume specified by DISKx. That default may be overridden by the NVOL= operand on the SELECT statement which selected the dataset.

If SMS (System Managed Storage) is active on this system, and the dataset does not already exist on the volume selected by NVOL= or the TAPEx DD statement, SMS is invoked to decide if the dataset should be SMS-managed. If so, SMS will select an output volume. SMS rules are detailed in [Section 52.50](#).

**SYSIN DD  
STATEMENT**

Specifies a data set containing the control statements for FDRCOPY. Usually a DD \* data set. Required for FDRCOPY.

## 21.04 FDRCOPY COPY/MOVE COMMAND

**COPY**    *TYPE=DSF*  
**MOVE**    *,BLKF=nn*  
           *,BUFNO=nn / MAX*  
           *,BYPASSACS*  
           *,BYPASSSMS*  
           *,CATIFALLOC*  
           *,DATA=ALL / USED*  
           *,DSNENQ=NONE / TEST / USE / HAVE*  
           *,ENQ=ON / OFF / RESERVE*  
           *,ENQERR=NO*  
           *,ENQERR=BYPASS / PROCESS*  
           *,ICFCAT=ORIGINAL / STEPCAT / ALIAS*  
           *,ICFCORE=nnnnnn*  
           *,LBPZERO=VALID / INVALID*  
           *,MAXCARDS=nnnnnn*  
           *,MAXERR=nnnn*  
           *,NOCAT,RECAT*  
           *,PRESTAGE*  
           *,RLSE,%FREE=    nn*  
           *,SELTERR=NO / YES*  
           *,SMSGDG=DEFERRED / ACTIVE / ROLLEDOFF / INPUT*

**COPY**    The COPY command specifies that FDRCOPY is to perform a copy operation, creating a duplicate  
**COMMAND** of the selected input datasets. The original datasets will not be modified in any way. However, if the  
           RECAT option is specified and the output dataset is not being given a newname, the catalog will be  
           updated to point to the dataset on the output volume serial.

**MOVE**    The MOVE command specifies that FDRCOPY is to perform a move operation, moving the  
**COMMAND** selected input datasets to a new disk volume. For each successfully moved dataset, the input  
           dataset will be scratched and uncataloged, and the catalog will be updated to point to the output  
           dataset; this is true even if the dataset was copied to a newname.

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## 21.04 CONTINUED . . .

OPERANDS	<b>TYPE=DSF</b>	Required. Specifies that this is a dataset operation.
	<b>BLKF=</b>	<p>Specifies that FDRCOPY is to reblock PS (fixed and variable formats) and PO data sets. Except when the copy/move is of a PS dataset to a smaller disk the blocking factor must result in a larger blocksize, otherwise it will be ignored. On partitioned data sets, FDRCOPY will set the blocksize to a higher value, but will not actually reblock the members.</p> <p>BLKF= specifies a value of 1 to 10. 1 is full track blocking (max 32760), 2 half track, to 10 for a tenth of a track blocking. On fixed files FDRCOPY will round down to a multiple of the LRECL.</p> <p>Default is that FDRCOPY will not reblock datasets. The operation will fail if the input dataset has blocks larger than the track size of the output disk.</p>
	<b>BUFNO=</b>	<p>Specifies the FDRCOPY performance option.</p> <p><b>MAX</b> — is the default and specifies that FDRCOPY is to acquire enough buffers to retain a cylinder of data in storage at a time. It can be overridden but the alternate performance option is much slower and is not recommended.</p>
	<b>BYPASSACS</b>	<p>On a system with SMS (System Managed Storage) active, specifies that the SMS ACS (Automatic Class Selection) routines are not to be invoked for datasets which must be allocated by FDRCOPY. If a dataset has a SMS storage class assigned (see STORCLAS= in <a href="#">Section 21.05</a>) it will be SMS-managed, and SMS will be invoked to allocate the dataset on a SMS-chosen volume, but SMS will not be allowed to override the storage class or management class assigned to the dataset.</p> <p>Default is that on an SMS system, the SMS ACS routines will be invoked for every dataset which has to be allocated. The assigned storage and management classes will be passed to those routines, which can approve or override them. A dataset will be passed to SMS for allocation if the storage class ACS routine assigns a storage class to the dataset.</p>
	<b>BYPASSSMS</b>	<p>On a system with SMS (System Managed Storage) active, specifies that FDRCOPY is to directly allocate datasets on SMS-managed volumes, bypassing normal SMS storage group and volume selection. The output volume (selected by the rules in <a href="#">Section 21.01</a>) must be a SMS-managed disk volume, and the datasets being copied/moved must have a SMS storage class assigned (see BYPASSACS above and STORCLAS= in <a href="#">Section 21.05</a>). FDRCOPY will allocate and catalog the datasets according to SMS standards.</p> <p>Normal SMS facilities do not allow allocation of datasets on specific volume serials, but BYPASSSMS will do so, allowing datasets to be located for performance or other reasons. Note that if BYPASSACS is also specified, the assigned SMS classes will not be validity- or authority-checked.</p> <p>Default is that on an SMS system, for datasets which are SMS-managed and must be allocated, the SMS storage group ACS routine will be invoked to select a storage group and SMS will select a SMS-managed volume and allocate and catalog the datasets.</p> <p>BYPASSACS and BYPASSSMS are primarily for use by storage administration personnel, since they bypass normal SMS allocation controls and rules. In order to use BYPASSACS or BYPASSSMS, the user of FDRCOPY must be authorized to the RACF profile</p> <p style="padding-left: 40px;">STGADMIN.ADR.COPY.BYPASSACS</p> <p>in class FACILITY, or the equivalent in other security systems.</p>

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## 21.04 CONTINUED . . .

**CATIFALLOC** Specifies that non-VSAM output datasets will be cataloged by FDRCOPY even if they were preallocated (not allocated by FDRCOPY) whenever FDRCOPY would have cataloged them if it allocated them (see the NOCAT and RECAT operands and Cataloging non-VSAM Output Data Sets in [Section 21.01](#)).

Default is that FDRCOPY will catalog the output datasets **only** when it allocates them.

**DATA=** **USED** — specifies that FDRCOPY is to read only the used portion of input PS or PO type data sets. On most volumes this will make the copy run faster, but at the risk of not copying all of the data if data sets have invalid last block pointers. If the data set has a last block pointer of all zeros which usually means it was never used, FDRCOPY will copy the entire data set unless LBPZERO=VALID is specified.

**ALL** — specifies that FDRCOPY is to read the entire allocation of input datasets. DATA=ALL should not be specified with RLSE or %FREE=.

Default is USED.

**DSNENQ=** Specifies that FDRCOPY is to enqueue on the names of the input and output data sets. It will issue an exclusive enqueue with a major name of SYSDSN and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, FDRCOPY will issue a warning message for the dataset and a U0888 ABEND will be issued at the end of FDRCOPY execution to call attention to the active dataset. If the enqueue fails on an input dataset, the dataset will not be copied/moved unless ENQERR=PROCESS was specified. If the enqueue fails on an output dataset, the dataset will not be copied/moved; output datasets will not be enqueued if they must be allocated by FDRCOPY.

**TEST** — The datasets will only be tested to see they are active at the time the copy/move starts. The datasets will not be enqueued.

**USE** — The datasets will be enqueued for the duration of the copy/move. If not available, a warning message is issued and the dataset will not be enqueued.

**HAVE** — The datasets will be enqueued for the duration of the copy/move. If not available, FDRCOPY will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. If WAIT is specified, FDRCOPY will wait for the data set to become available. The job could time out. If NOWAIT is specified, FDRCOPY will print a warning message for the dataset and will not issue the enqueue. If RETRY is specified, FDRCOPY will attempt the enqueue again.

**NONE** — No dataset enqueue will be issued.

Default is USE.

NOTE: If the data set is specified in a DD statement in the FDRCOPY job with DISP=SHR, DSNENQ= (other than NONE) will change the shared enqueue for the data set to EXCLUSIVE (DISP=OLD). The operator should respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.

CAUTION: This option should not be used on shared DASD unless a cross-system enqueue facility is available and the SYSDSN QNAME is broadcast across systems. Without this capability, FDRCOPY can only determine which datasets are active on the system it is running on.

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## 21.04 CONTINUED . . .

- ENQ=** **ON** — specifies that FDRCOPY is to perform an enqueue on the VTOC of the input volume during the copy/move operation. This enqueue will lock out users from allocating new data sets or scratching old data sets from the system on which FDRCOPY is running.
- RESERVE** — specifies that FDRCOPY will issue a RESERVE on the VTOC of the input volume. This command will lock out a shared DASD system from accessing the pack. It includes the effect of ENQ=ON on the system on which FDRCOPY is running.
- OFF** — specifies that FDRCOPY will not enqueue the VTOC.
- Default is OFF — no VTOC enqueue.
- WARNING: Do not specify ENQ=ON/RESERVE if there is a possibility that output data sets may be allocated on the input volume. VTOC ENQs are not normally required for FDRCOPY.**
- ENQERR=** **NO** — specifies that FDRCOPY will not set a condition code or ABEND at the end of execution if the DSNENQ= option is used (or DSNENQ=USE is defaulted) and a data set is found to be active.
- Default is that FDRCOPY will issue the condition code or ABEND.
- ENQERR=** **BYPASS** — specifies that FDRCOPY will not copy or move a dataset if the DSNENQ= option is specified (or DSNENQ=USE is defaulted) and an input dataset is found to be active.
- PROCESS** — specifies that FDRCOPY will copy or move an input dataset even though it was found to be active by the DSNENQ= option. In this case, the message issued by FDRCOPY for the active dataset is strictly a warning.
- Default is BYPASS.
- NOTE:** Both ENQERR=NO and ENQERR=BYPASS/PROCESS may be specified on the same COPY/MOVE command.
- ICFCAT=** ICF VSAM files only. Specifies the source of the catalog name to be used by FDRCOPY if an output ICF VSAM cluster is to be allocated.
- ORIGINAL** — on a MOVE to the same name, specifies that FDRCOPY is to use the catalog in which the input cluster is cataloged.
- On a COPY to the same name, ICFCAT=ORIGINAL is not valid; a COPY operation requires either a new name or a different catalog.
- On a copy or move to a new name, ICFCAT=ORIGINAL is ignored, and ICFCAT=ALIAS normally is used. If it is desired to catalog the output cluster into the same catalog as the input cluster, the user must specify ICFCAT=STEEPCAT, and must supply a STEPCAT DD statement pointing to that catalog.
- STEEPCAT** — specifies that FDRCOPY is to use the STEPCAT as the catalog. If a STEPCAT DD statement is not supplied, FDRCOPY will use the master catalog or the catalog which is aliased for this data set in the master catalog.
- ALIAS** — specifies that FDRCOPY is to determine the catalog from the alias name in the master catalog. If no alias is found, and the cluster is being copied or moved to the same name, FDRCOPY will use the input cluster's catalog. If no alias is found, and the cluster is being copied or moved to a new name, FDRCOPY will use the STEPCAT (if present in the JCL) or the master catalog. Multi-level alias is supported.
- Default: ORIGINAL, except that if the cluster is being copied or moved to a newname (NEWGROUP or NEWINDEX specified) the default is ALIAS. If the output cluster is SMS-managed, ALIAS is forced.

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<b>ICFCORE=</b>	<p>Specifies that FDRCOPY is to increase the size of the table used to store the ICF VSAM cluster and component names. It needs to save all of the component names and their associated clusters which currently exist on the input volume. nnnnnnn is specified in bytes and must be large enough to contain all the VSAM names.</p> <p>NOTE: Specifying ICFCORE= will increase the FDRCOPY memory requirement by the value specified. The default value imposes no additional memory requirement.</p> <p>Default is 49152 bytes, which normally holds about 600 ICF VSAM components. If the input disk is a 3390, the default is 53248, which will hold about 650 components.</p>
<b>LBPZERO=</b>	<p><b>VALID</b> — specifies that FDRCOPY is to consider PS data sets which are empty (last block pointer of zero) as containing one used track.</p> <p><b>INVALID</b> — specifies that FDRCOPY will consider PS data sets which are empty as fully used.</p> <p>WARNING: Care should be taken using VALID since certain data sets may have the last block pointer as all zeroes and not be empty. EX: SYS1.DUMP data sets.</p> <p>Default is INVALID or the option set in the FDR option table (<a href="#">See Section 91 or 92</a>).</p>
<b>MAXCARDS=</b>	<p>Enables FDRCOPY to accept additional SELECT/EXCLUDE commands.</p> <p>Default is a maximum of 250 commands.</p>
<b>MAXERR=</b>	<p>Specifies the number of input or output disk errors that are to be bypassed by FDRCOPY prior to ABENDING the operation. MAXERR may specify a value from 1 to 9999 errors. Errors on the input and output disks are counted separately, but MAXERR= specifies the maximum for each counter. See DIAGNOSTIC PROCESSING in <a href="#">Section 21.01</a> for the effect of errors and MAXERR= on FDRCOPY processing.</p> <p>Default is 20 errors.</p>
<b>NOCAT RECAT</b>	<p><b>NOCAT</b> specifies that FDRCOPY will not catalog any non-VSAM output datasets. This option is ignored for ICF VSAM clusters and SMS-managed datasets since these must always be cataloged.</p> <p><b>RECAT</b> specifies that FDRCOPY should catalog non-VSAM output datasets even if they are currently cataloged to another volume.</p> <p>Default: For a COPY operation, FDRCOPY will catalog output non-VSAM datasets unless they are currently cataloged (even if to the input volume).</p> <p>For a MOVE operation, FDRCOPY will catalog output non-VSAM datasets unless they are currently cataloged to a volume other than the input volume.</p> <p>NOTE: NOCAT and RECAT are mutually exclusive. FDRCOPY will normally only attempt to catalog output datasets which it allocates (not pre-allocated) unless the CATIFALLOC operand is specified.</p>

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## 21.04 CONTINUED . . .

**PRESTAGE**

Specifies that FDRCOPY is not to copy or move datasets if the output datasets already exist on the output volumes. This may be used to avoid copying or moving datasets which have already been copied/moved.

Default is that FDRCOPY will copy to pre-allocated datasets, overlaying the existing contents of those datasets. If the output datasets do not exist, they will be allocated.

**RLSE  
%FREE=**

**RLSE** — specifies that FDRCOPY is to release all of the unused space in the output datasets for the selected PS and PO datasets.

**%FREE=nn** — specifies a percentage (nn%) of the PS and PO datasets to be left free after the copy/move. The datasets will not be expanded in size from the original allocation of the input dataset. nn may range from zero (0) which will free all of the free space (same as RLSE) to 99 which will attempt to leave the datasets with 99% free space.

Space will be released only from datasets allocated by FDRCOPY.

DATA=ALL is incompatible with RLSE and %FREE=.

Default is that FDRCOPY will not release space from output datasets.

**SELTERR=**

**NO** — specifies that FDRCOPY is not to issue a U0888 ABEND if a SELECT statement is not referenced.

**YES** — specifies that FDRCOPY will issue a U0888 abend at the end of the COPY/MOVE if any SELECT/EXCLUDE statement did not apply to any dataset on any disk.

Default is YES unless overridden in the FDR/ABR global option table ([See Section 91 or 92](#)).

**SMSGDG=**

Specifies the status of SMS-managed GDG (Generation Data Group) datasets, if allocated by FDRCOPY.

**DEFERRED, ACTIVE, or ROLLEDOFF** will set the GDG to that status.

**INPUT** will set the GDG to the SMS status of the input GDG generation. If the input GDG is non-SMS, it will be set ACTIVE if that generation is cataloged, otherwise DEFERRED.

Default is DEFERRED, except for MOVE to the same name (no NEWNAME, NEWGROUP, or NEWINDEX parameter) when the default is INPUT.

## 21.05 SELECT/EXCLUDE COMMAND FOR COPY/MOVE

**SELECT**    *DSN=filter | CATDSN=filter | DD=ddname | ALLDSN*  
**S**            *| FROM(CYL=cccc,TRK=tttt),TO(CYL=cccc,TRK=tttt)*

**EXCLUDE**    *BLKF=nn*  
**X**            *,CATALOG=catname | ,MCATALOG=catname*  
                 *,CATLIMITGDG=n*  
                 *,DATA=ALL*  
                 *,DATACLAS=dataclass | ,NULLDATACLAS*  
                 *,DSNENQ=NONE*  
                 *,DSORG=(xx,xx,..)*  
                 *,MGMTCLAS=managementclass | ,NULLMGMTCLAS*  
                 *,NEWNAME=newname, | NEWGROUP=newgroup, | NEWINDEX=newindex*  
                 *| ,NEWDD=newddname*  
                 *,NOCAT,RECAT*  
                 *,NVOL=(vvvvvvv,vvvvvv,...)*  
                 *,PRESTAGE*  
                 *,PRTALIAS*  
                 *,RLSE | ,%FREE=nn*  
                 *,STORCLAS=storageclass,NULLSTORCLAS*  
                 *,TAPEDD=x | ,VOL=vvvvvvv*  
                 *,TRK=nnnnn | ,CYL=nnnnn*

CONTINUED . . .

## 21.05 CONTINUED . . .

**SELECT/  
EXCLUDE  
COMMAND  
for COPY and  
MOVE**

The SELECT command selects the datasets which will be copied or moved. FDRCOPY will scan the VTOC of each input volume for datasets which match the parameters on a SELECT statements. Datasets may be selected by fully-qualified dataset name or by using generic dataset name selection (DSN=), or by copying a dataset name from a DD statement (DD=). All datasets on an input volume may be selected (ALLDSN). Data sets may also be selected from the system catalogs by fully-qualified name or using a generic filter (CATDSN=).

It is also possible to copy specified tracks or ranges of tracks or cylinders to the identical locations on the output volume (FROM-TO). This operation will be a copy regardless of the COPY or MOVE command, since these tracks will not be associated with any particular dataset, and no data on the input disk volume will be disturbed. However, no check is made to see if the equivalent tracks on the output disk volume belong to any particular dataset, so this function should be used with care.

The EXCLUDE command prevents certain datasets from being copied or moved. The datasets to be excluded may be specified by fully-qualified name or by using generic dataset name selection (DSN=) or copied from a DD statement (DD=). The EXCLUDE command may be used to exclude particular datasets that would be selected by a more-encompassing SELECT statement. The EXCLUDE command with the FROM/TO operands may be used to exclude particular tracks from the copy or move of a data set. **Since SELECT/EXCLUDE commands are scanned in the order they are input, EXCLUDE commands should usually precede SELECT commands.**

SELECT and EXCLUDE commands will apply to all input disk volumes unless TAPEDD= or VOL= parameters are specified.

**COPYING ICF  
VSAM FILES**

FDRCOPY supports copying ICF VSAM clusters by cluster name using the DSN=, CATDSN= or ALLDSN operands. All components of a cluster on a given input volume will be copied. This includes alternate indexes and key range components. The component names will be reported by FDRCOPY followed by the base cluster name. All of the associated VVR information from the VVDS will be copied to the VVDS of the output disk. See "ICF VSAM Support" and the following topics in [Section 21.01](#) for other considerations for copying or moving VSAM.

**OPERANDS DSN=**

Specifies a fully-qualified dataset name or a filter to be used for generic dataset selection, as described in [Section 52.16](#). This name or filter will be used when scanning the VTOCs of selected input volumes.

EXAMPLES: DSN=USER1. JCL. CNTL  
DSN=\*\*LI ST  
DSN=PROD++. \*. LI B\*

DSN= does not have any special support for selecting GDGs, you can use CATDSN= to select relative generation number for a GDG.

NOTE: The DSG= operand documented in previous versions of FDRCOPY is still accepted, but the DSN= operand with a generic dataset name filter is the preferred way of selecting groups of datasets.

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## 21.05 CONTINUED . . .

**CATDSN=**

Specifies a fully-qualified dataset name or a filter to be used for generic dataset selection from system catalogs, as described in [Section 52.16](#).

If a fully-qualified name is specified, that name will be located in the system catalogs, and the volume serial(s) from the catalog become an implied VOL= parameter (if there are no DISKx DD statements pointing to those volumes, FDRCOPY will dynamically allocate and process them as input volumes). Specification of a relative generation number for GDG datasets is supported (e.g., CATDSN=A.B(—1)).

If a filter is specified, then catalogs will be scanned for all cataloged datasets matching the filter, and they will be processed as if a SELECT CATDSN=dsname was present for each of them. It may be necessary to specify MAXCARDS=nnnnn if a large number of datasets are selected by the filter.

**Additional considerations for CATDSN=filter are explained in [Section 52.16](#).**

CATDSN= is supported only on SELECT statements.

If the VOL= operand is also specified on a SELECT statement with CATDSN=, then only datasets cataloged to those volumes will be selected.

EXAMPLES:     CATDSN=USER1. JCL. CNTL  
                  CATDSN=\*\*MASTER(O)  
                  CATDSN=PROD+\*. \*. LI B\*

Normally CATDSN= will not display the datasets it selects from the catalogs, you will see the names only when FDRCOPY actually finds and selects the datasets in the VTOCs of the volumes they are cataloged to. To display all of the datasets selected specify PCATDSN=filter.

WARNING: depending on the filter specified, CATDSN= may need to search many catalogs.

**DD=**

Specifies that a data set name is to be taken from a DD statement. This operand must point to the DDNAME of a JCL statement. Using this option enables the user to specify a non-standard data set name or a generation data set name.

EXAMPLE:     SELECT     DD=DD1  
                  //DD1     DD     DSN=A. B. C(O), DI SP=SHR

**ALLDSN**

Specifies that FDRCOPY is to process all the data sets on the volumes specified. DSN=\*\* is equivalent to ALLDSN.

**FROM/TO**

Specifies an absolute track copy of the tracks identified. The values are specified in decimal, relative to zero. The alternate tracks of a volume cannot be copied. For example, valid specification on a 3380-E are CYL=0 TRK=0 through CYL=1769 TRK=14. The FROM address must not be higher than the TO address. If the FROM track is not specified, zero is assumed. If the TO track is not specified, the last track of the cylinder is assumed. Absolute track commands can be mixed with SELECT commands for data sets. The FROM and TO operands must appear on the same control record, and cannot be continued. FROM/TO can be used on an EXCLUDE command to exclude particular tracks from the copy or move of a data set.

NOTE: DSN=, CATDSN=, DD=, ALLDSN and FROM/TO are mutually exclusive. One and only one of these operands must be specified on each SELECT or EXCLUDE card.

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## 21.05 CONTINUED . . .

<b>BLKF=</b>	<p>Specifies that FDRCOPY is to reblock PS (fixed and variable formats) and PO datasets. Except when copying/moving a PS dataset to a smaller disk the blocking factor must result in a larger blocksize, otherwise it will be ignored. On partitioned data sets, FDRCOPY will set the blocksize to a higher value, but will not actually reblock the members.</p> <p>BLKF= specifies a value of 1 to 10. 1 is full track blocking (max 32760 on 3380 and 3390), 2 half track, to 10 for a tenth of a track blocking. On fixed files FDRCOPY will round down to a multiple of the LRECL.</p> <p>Default is that FDRCOPY will not reblock datasets unless BLKF= was specified on the COPY/MOVE statement. The operation will fail if the input dataset has blocks larger than the track size of the output disk.</p>
<b>CATALOG=</b> <b>MCATALOG=</b>	<p>Specifies the name of a user catalog (CATALOG=) or alternate master catalog (MCATALOG=) to search when CATDSN= is specified. <a href="#">See Section 52.16</a> for details.</p> <p>Default is that the catalog search will start with the active master catalog. User catalogs will be searched if their assigned aliases match the CATDSN=filter.</p>
<b>CATLIMITGDG=</b>	<p>May be used with CATDSN=filter to limit the selection of GDGs from the catalogs. It will not affect the selection of cataloged non-GDG datasets, but if the filter selects a GDG then:</p> <p><b>n</b> will cause only the most recently created “n” generations to be selected.</p> <p><b>—n</b> will cause only generation (—n) to be selected.</p> <p>Default is that all the generations of selected GDGs will be selected (unless a relative generation number is specified at the end of the filter, e.g., CATDSN=filter(—2)).</p>
<b>DATA=</b>	<p><b>ALL</b> — specifies that FDRCOPY will copy/move the entire allocated space of the selected datasets. Normally it will only process up to the last block pointer (end-of-file) on input PS or PO data sets. Should be used if the last block pointer is invalid. DATA=ALL should not be used with RLSE or %FREE=.</p>
<b>DATACLAS=</b> <b>NULLDATACLAS</b>	<p>On a system with SMS active, specifies the SMS data class to be associated with the output dataset, overriding the data class of the input dataset (if any).</p> <p>NULLDATACLAS changes the data class to null (not specified).</p> <p>Default is that the original data class of the input dataset (if any) will be associated with the output dataset if it is allocated as SMS-managed.</p>
<b>DSNENQ=</b>	<p><b>NONE</b> — specifies that FDRCOPY is to bypass the data set enqueue for the selected datasets. May be used to override the DSNENQ= option on the COPY/MOVE command.</p>
<b>DSORG=</b>	<p>Specifies that this SELECT/EXCLUDE command is to apply only to datasets whose dataset organization matches one of the DSORGs specified. If more than one DSORG is specified, they must be enclosed in parentheses.</p>

Valid DSORGs are:

DA — BDAM	PS — SEQUENTIAL
IS — ISAM	PO — PARTITIONED
AM — ALL VSAM	EF — ICF VSAM
UN — UNDEFINED (NONE)	UM — UNMOVABLE

CONTINUED . . .

## 21.05 CONTINUED . . .

**MGMTCLAS=**  
**NULLMGMTCLAS**

On a system with SMS active, specifies the SMS management class to be presented to the SMS management class ACS routine for the output dataset, overriding the management class of the input dataset (if any). The ACS routine may accept or override this class.

NULLMGMTCLAS changes the management class to null (not specified).

Default is that the management class of the input dataset (if any) will be passed to the ACS routine for the output dataset if it is allocated as SMS-managed.

**NEWNAME=**  
**NEWN=**

Specifies that FDRCOPY is to copy or move a data set to a new name. NEWNAME should only be used with DSN= or DD=, and should not be used for ICF VSAM clusters if they must be allocated. If the newname ends in a GDG relative generation number, e.g., NEWNAME=gdgname(-1), a LOCATE will be done to get the proper absolute generation number.

**NEWGROUP=**  
**NEWG=**

Specifies that the data sets selected are to be copied or moved using a new group name. The number of characters specified will replace left to right the data set name. Care should be taken when periods are used that index levels are not incorrectly changed. FDRCOPY will validate the output dataset for OS standard naming conventions.

EXAMPLE: SELECT DSN=ABC\*\* , NEWG=XYZ

Any data sets copied/moved will be renamed starting with characters XYZ.

**NEWINDEX=**

Specifies that the data set is to be copied or moved with one or more index levels

**NEWI=**

being added or replaced in the original name. FDRCOPY will use each index level specified in NEWI in place of the original index level. If a period is specified without any characters preceding, FDRCOPY will copy one original index level. If + is specified, FDRCOPY will insert the characters following a plus as a new index level. If ++ is specified, FDRCOPY will add the characters following the plus-plus to the end of the original name. If — is specified, FDRCOPY will drop an index level and its preceding period from the original name. FDRCOPY will validate the output dataset for OS standard naming conventions.

EXAMPLE: SELECT DSN=A. B. C, NEWI =XYZ. ++END

will result in the newname 'XYZ.B.C.END'

SELECT CATDSN=PAY. MASTER\*\* , NEWI =. TESTMAST

will result in the newname 'PAY.TESTMAST.xxxxx'.

SELECT DSN=A. B. C. D, NEWI =. -- X

will drop the middle two index levels and replace the last, resulting in newname 'A.X'

If the NEWINDEX value ends in a GDG relative generation number, e.g., NEWI=..NEWMAS(-2), that relative number will be added to the end of the newname, and a LOCATE done to get the proper absolute generation number.

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## 21.05 CONTINUED . . .

<b>NEWDD=</b>	<p>Specifies the name of a DD statement from which FDRCOPY will obtain the NEWNAME for the copy/move.</p> <p>NOTE: NEWN=, NEWG=, NEWI=, and NEWDD= are mutually exclusive. If none of them are specified, the dataset will be copied or moved under its original name. One of these parameters is required when copying ICF VSAM clusters since clusters cannot be copied under their original name; however a new name is not required when moving ICF VSAM clusters (<a href="#">See ICF VSAM in Section 21.01</a>).</p>
<b>NOCAT</b>	<b>NOCAT</b> specifies that FDRCOPY will not catalog any non-VSAM output datasets
<b>RECAT</b>	<p>selected by this SELECT command. This option is ignored for ICF VSAM, since VSAM clusters must always be cataloged.</p> <p><b>RECAT</b> specifies that FDRCOPY should catalog non-VSAM output datasets even if they are currently cataloged to another volume.</p> <p>Default: Cataloging will be controlled by the NOCAT or RECAT operands on the COPY/MOVE command or their defaults.</p> <p>NOTE: NOCAT and RECAT are mutually exclusive.</p>
<b>NVOL=</b>	<p>Specifies the volume serial(s) for output disk volumes to which datasets selected by this statement are to be copied/moved. A single volume serial may be specified as NVOL=volser or multiple volume serials may be specified:</p> <ol style="list-style-type: none"> <li>1) A list of volume serials may be given, enclosed in parentheses, e.g., NVOL=(TSO001,TSO002,TSO003)</li> <li>2) A volume group may be specified by placing an asterisk at the end of the volser prefix, e.g., NVOL=TSO*</li> <li>3) The two may be combined, e.g., NVOL=(TSO*,PROD*,ABC001)</li> <li>4) All online disk volumes may be selected by NVOL=*</li> </ol> <p>Volume serials which are not online will be ignored. FDRCOPY will attempt to allocate the output datasets on the first volume specified. If an allocation fails, it will be retried on the next volume in the list (in ascending device address order) until it succeeds (or until it fails on 64 volumes). If the list contains several disk device types, "like" volumes (same type as the input disk) will be tried first, then unlike devices).</p> <p>Specifying multiple volsers or a group allows FDRCOPY to copy or move datasets in one pass even when no one volume has available space to contain them all.</p> <p>Default is that the output volume will be selected by rules defined in <a href="#">Section 21.01</a>.</p> <p>On a system with SMS active, NVOL= may be ignored if the dataset does not exist on the volume specified and the dataset is SMS-managed (see STORCLAS= next page).</p>
<b>PRESTAGE</b>	Specifies that FDRCOPY is not to copy or move datasets selected by this SELECT command if the output datasets already exist on the output volumes. This may be used to avoid copying or moving datasets which have already been copied/moved.
<b>PRTALIAS</b>	When used on a SELECT statement with CATDSN= will display all of the alias names and user catalogs that were searched.

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## 21.05 CONTINUED . . .

<b>RLSE</b>	<b>RLSE</b> specifies that FDRCOPY is to release all of the unused space in the output
<b>%FREE=</b>	datasets for the selected PS and PO datasets.  <b>%FREE=nn</b> — specifies a percentage (nn%) of the PS and PO datasets to be left free after the copy/move. The datasets will not be expanded in size from the original allocation of the input dataset. nn may range from zero (0) which will free all of the free space (same as RLSE) to 99 which will attempt to leave the datasets with 99% free space.  Space will be released only from datasets allocated by FDRCOPY.  Default is the RLSE or %FREE operands specified on the COPY/MOVE command; if not specified there, no space will be released from output datasets.
<b>STORCLAS=</b>	On a system with SMS active, specifies the SMS storage class to be presented
<b>NULLSTORCLAS</b>	to the SMS storage class ACS routine for the output dataset, overriding the storage class of the input dataset (if any). The ACS routine may accept or override this class.  NULLSTORCLAS changes the storage class to null (not specified).  Default is that the storage class of the input dataset (if any) will be passed to the ACS routine for the output dataset.  If the storage class ACS routine assigns a storage class to this dataset, the dataset will be allocated as SMS-managed.
<b>TAPEDD=</b>	<b>x</b> — specifies the same character as specified in a DISKx DD statement. If this operand is specified, then this SELECT/EXCLUDE will only apply to datasets on the input disk volume specified by the DISKx DD statement. TAPEDD=might be used when multiple DISKx DD statements point to the same input volume but the datasets are to be output to different output volumes as specified by TAPEx DD statements or NVOL= operands.
<b>TRK=</b> <b>CYL=</b>	If FDRCOPY is to allocate the data set, specifies the number of cylinders or tracks to be used for the space allocation. On PS or PO files when DATA=ALL is not specified, this value must be at least equal to the used portion of the data set. On all other types of files, and when DATA=ALL is specified, this value must be equal to or greater than the original size of the file. For ICF VSAM clusters, modifies the size of the base data component only.  Default is that FDRCOPY will use the original size of the data set.
<b>VOL=</b>	Specifies the input disk volume serial(s) to which this SELECT/EXCLUDE command is to apply. It may specify a single serial (e.g., VOL=ABC123 or a group of volumes all starting with the same prefix (e.g., VOL=ABC*). If there are online disk volumes matching the VOL= value that are not pointed to by DISKx DD statements in the FDRCOPY step, FDRCOPY will automatically dynamically allocate them and process them as input volumes.  NOTE: The VOLG= operand documented in previous versions of FDRCOPY is still accepted, but the VOL=xxxx* is the preferred way of selecting groups of volumes.  Default: If neither TAPEDD= or VOL= are specified, the SELECT/EXCLUDE command will apply to all input volumes.  NOTE: TAPEDD= and VOL= are mutually exclusive. One and only one of these operands may be specified.



**21.06 FDRCOPY DATASET COPY EXAMPLES**

The COPY operation will create a duplicate of the original datasets without modifying the originals in any way. The output datasets may have the same name as the originals, or may be modified to have new names (using NEWNAME=, NEWGROUP=, or NEWINDEX=). If copying under the original names, the catalog may be updated to point to the new copy (RECAT parameter). By default, datasets will not be copied if they are currently in use (allocated to another task).

**COPY  
NON-VSAM  
DATASETS TO  
NEWNAME**

COPY non-VSAM datasets from one input volume (3380J1) to a new volume, giving them new names, and cataloging the new names. This might be used to create test copies of existing datasets. In this example, TEST.FILE1 will be copied as TEST.FILE2 and all datasets beginning with PAYROLL will be copied with a new second level index of TEST inserted; only PAYROLL files which are sequential or partitioned will be copied. The input volume (3380J1) is specified by a DISK1 DD statement, but could also have been specified by a VOL=3380J1 operand on the SELECT statements.

```
//COPYFI LS   EXEC   PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//DI SK1      DD     UNI T=DI SK, VOL=SER=3380J1, DI SP=OLD
//SYSI N      DD     *
                COPY   TYPE=DSF
                SELECT  DSN=TEST. FI LE1, NEWNAME=TEST. FI LE2, NVOL=3380J2
                SELECT  DSN=PAYROLL **, NEWI =. +TEST, DSORG=(PS, PO), NVOL=3380J2
```

**COPY  
ICF VSAM  
CLUSTERS TO  
NEWNAME  
USING THE  
CATALOG**

COPY ICF VSAM datasets to a new volume, giving them new names. In this example, all cataloged clusters whose cluster name begins with ABC will be copied and will have the first index level of the cluster and all components changed to XYZABC. Any clusters which are multi-volume will be properly copied. MAXCARDS=1000 was specified in case more than 250 clusters are selected.

```
//COPYVSAM    EXEC   PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
                COPY   TYPE=DSF, MAXCARDS=1000
                SELECT  CATDSN=ABC. **, NEWI =XYZABC,
                        DSORG=EF, NVOL=( 3380J3, 3380J4)
```

NOTE: Since ICF VSAM clusters must be cataloged when created, the same cluster or component name cannot be cataloged on two different volumes at the same time, so ICF VSAM files must be copied using a newname (the NEWINDEX= or NEWGROUP= parameter). However, ICF VSAM clusters may be moved under their original name (FDRCOPY uses a temporary cluster name for the output, then scratches the original and renames the output when the move is successfully completed). See ICF VSAM in Section 21.01 for details.

**21.07 FDRCOPY DATASET MOVE EXAMPLES**

The MOVE operation will move datasets from one disk volume to another. The output datasets may have the same name as the originals, or may be modified to have new names (using NEWNAME=, NEWGROUP=, or NEWINDEX=). In either case, if the move is successful, the original dataset will be scratched and the catalog will be updated to point to the new dataset. By default, datasets will not be moved if they are currently in use (allocated to another task).

**MOVE  
NON-VSAM  
VOLUMES**

MOVE non-VSAM datasets to a new volume under their original names, and scratch the original datasets. They will be recataloged to the output volume only if they were cataloged to the input volume. All ISPF datasets ("ISPF" anywhere in their names) on the input volume will be moved except PROFILE datasets (last index level of "PROFILE"). The recatalog and scratch will be done only if the copy was successful. The EXCLUDE statement will automatically exclude all VSAM files. The input and output volumes are specified by DISK1 and TAPE1 DD statements, but could also have been specified by VOL= and NVOL= operands on the SELECT statement.

```
//MOVEFI LS   EXEC   PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//DISK1       DD     UNI T=DI SK, VOL=SER=3380K1, DI SP=OLD
//TAPE1       DD     UNI T=DI SK, VOL=SER=3380K2, DI SP=OLD
//SYSI N      DD     *
                MOVE   TYPE=DSF
                EXCLUDE ALLDSN, DSORG=AM
                EXCLUDE DSN=*. PROFI LE
                SELECT  DSN=**I SPF**
```

**MOVE  
DATASETS  
SELECTED  
FROM THE  
CATALOG**

MOVE cataloged data sets to a new volume. The CATDSN= operand will cause the volume(s) the data sets are cataloged on to be processed as input volume(s). One specific data set, plus all DB2 data sets, will be moved (the mask on the second SELECT will select only DB2 clusters). All selected data sets will be moved to volume 3390T1.

```
//MOVEFI LE   EXEC   PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
                MOVE   TYPE=DSF
                SELECT  CATDSN=MY. DATASET, NVOL=3390T1
                SELECT  CATDSN=*. DSNDBC. *. *. I 0001. A*, NVOL=3390T1
```

**COMBINE  
SEVERAL  
VOLUMES  
ONTO ONE  
VOLUME**

Combine 3 3380 single density volumes (selected by VOL=3380J\*) onto a 3380-K (triple density), by moving all of the datasets (including all non-VSAM and all single-volume ICF VSAM clusters). If the datasets were cataloged to the input volume the catalog will be updated to point to the dataset's new volume. If the input volumes contain indexed VTOCs, VVDSs, or ABR models they will automatically be excluded (message FDR159 REASON=3 may be produced and can be ignored; no ABEND or error code will result). The 3 input volumes will be processed one at a time to avoid head movement on the output volume. Since the input volumes may contain a large number of datasets or ICF VSAM clusters which may increase FDRCOPY's storage requirements, the region requested is increased from the usual 2000K to 4096K.

```
//COMBI NEK   EXEC   PGM=FDRCOPY, REGI ON=4096K
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
                MOVE   TYPE=DSF
                SELECT  ALLDSN, VOL=3380J*, NVOL=3380K1
```

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## 21.07 CONTINUED . . .

**SPLIT ONE  
VOLUME INTO  
SEVERAL  
VOLUMES**

MOVE all datasets from a 3390-3 (triple density) to several 3390-2 (double density) volumes (including all non-VSAM and all single-volume ICF VSAM clusters). If the datasets were cataloged to the input volume the catalog will be updated to point to the dataset's new volumes. If the input volume contains an indexed VTOC, VVDS, or ABR model they will automatically be excluded (message FDR159 REASON=3 may be produced and can be ignored; no ABEND or error code will result). "NVOL=3390D\*" will select all online disks whose volser starts with "3390D" for output; the disk with the lowest device address will be used until datasets can no longer be allocated on it, then the next such volume will be used.

```
//SPLI TVOL  EXEC  PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT   DD    SYSOUT=*
//SYSUDUMP    DD    SYSOUT=*
//SYSI N      DD    *
      MOVE     TYPE=DSF
      SELECT   ALLDSN, VOL=3390T1, NVOL=3390D*
```

**21.08 FDRCOPY SMS EXAMPLES**

The following are examples of using FDRCOPY to copy and move datasets on a system which has SMS (System Managed Storage) active. They illustrate techniques for converting datasets to and from SMS management. Output datasets will be SMS-managed if the SMS storage class ACS routine assigns a storage class to the dataset or if it accepts the storage class passed to it by FDRCOPY. ACS routines are coded by each installation, so the decision on whether a dataset is to be SMS-managed is a local one, and is usually out of the control of FDRCOPY (and the end-user).

When using FDRCOPY to create output datasets which are SMS-managed, you need not specify an output volume. If the output dataset is SMS-managed, SMS will assign an output volume. However, if any output dataset is not assigned a storage class, it will not be copied/moved unless a non-SMS target volume is specified by a TAPEX DD or by the NVOL= operand.

**CONVERT DATASETS TO SMS**

MOVE a set of datasets from 3 non-SMS volumes, converting them to SMS management. The SMS ACS routines must be coded to assign these datasets a storage class; SMS will select an output volume for each and allocate the datasets. The original datasets will be scratched, and the output datasets will be cataloged on the SMS volumes.

```
//CONVSMS      EXEC   PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//SYSI N        DD     *
                MOVE    TYPE=DSF
                SELECT   DSN=PROD**, VOL=PRODO1
                SELECT   DSN=PROD**, VOL=PRODO2
                SELECT   DSN=PROD**, VOL=PRODO3
```

**COPY SMS-MANAGED DATASETS**

COPY a set of SMS-managed datasets, creating SMS-managed copies. The original storage and management classes of the input datasets will be passed to the SMS ACS routines, which may accept or override them. Datasets with a first-level index beginning with "APPL" will be copied. The NEWI= parameter is used to insert "TEST" as a new second-level index in all the output dataset names.

```
//COPYSMS      EXEC   PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//SYSI N        DD     *
                COPY    TYPE=DSF
                SELECT   CATDSN=APPL*. **, NEWI =. +TEST
```

**OVERRIDE SMS CLASSES**

MOVE a set of datasets (which may be SMS-managed or non-SMS), making them SMS-managed and requesting that certain SMS classes be assigned to the output datasets. The storage and management classes specified will be passed to the SMS ACS routines, which may accept or override them. The input datasets will be scratched and the output datasets will be cataloged on the output SMS volumes.

```
//MOVESMS      EXEC   PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//DI SK1        DD     UNI T=DI SK, VOL=SER=ABC123, DI SP=OLD
//SYSI N        DD     *
                MOVE    TYPE=DSF
                SELECT   DSN=APPL2**, STORCLAS=APPL, MGMTCLAS=WKBACKUP
```

CONTINUED . . .

## 21.08 CONTINUED . . .

**CONVERT SMS  
DATASETS TO  
NON-SMS**

MOVE all datasets off of an SMS-managed volume, requesting that they be converted to non-SMS. The SMS ACS routines will be invoked, but the storage class routine will be passed a null storage class; if it accepts the null class, FDRCOPY will allocate the output datasets as non-SMS on the volumes specified by NVOL=.

```
//MOVENSMS EXEC PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSI N DD *
MOVE TYPE=DSF, RECAT
SELECT ALLDSN, NULLSTORCLAS, VOL=SMS123, NVOL=(XYZ234, XYZ345)
```

**BYPASS ACS  
ROUTINES**

An authorized user (such as a storage administrator) may need to bypass the SMS ACS routines, to force a dataset to be SMS-managed or non-SMS-managed, and to specify the SMS classes to be used. In this example, TEST.DATASET1 will be assigned the specified SMS classes; SMS will be invoked to select a storage group and assign a volume. TEST.DATASET2 will be assigned a null storage group, so it will be moved to the non-SMS volume specified by TAPE1. See the description of BYPASSACS in [Section 21.04](#) for authorization requirements.

```
//BYPASS EXEC PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//DI SK1 DD UNI T=DI SK, VOL=SER=SMS123, DI SP=OLD
//TAPE1 DD UNI T=DI SK, VOL=SER=XYZ234, DI SP=OLD
//SYSI N DD *
MOVE TYPE=DSF, RECAT, BYPASSACS
SELECT DSN=TEST. DATASET1, MGMTCLAS=TESTDS, STORCLAS=TEST
SELECT DSN=TEST. DATASET2, NULLSTORCLAS
```

**BYPASS SMS  
ALLOCATION**

An authorized user (such as a storage administrator) may need to force the allocation of SMS-managed datasets onto specific volumes; normal SMS facilities will not allow you to do so, but FDRCOPY does. Each dataset selected will be passed to the SMS storage and management class ACS routines; each dataset to which SMS assigns a storage class will be allocated and cataloged on the volume indicated by NVOL=; this volume **MUST** be a SMS-managed volume. Any dataset which does not get a storage class assigned will not be moved. See the description of BYPASSSMS in [Section 21.04](#) for authorization requirements.

```
//BYPASS EXEC PGM=FDRCOPY, REGI ON=2000K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSI N DD *
MOVE TYPE=DSF, BYPASSSMS
SELECT CATDSN=DEVEL **, NVOL=SMS123
```

NOTE: BYPASSACS and BYPASSSMS may be used together. If so, any dataset which was originally SMS-managed or which has a SMS storage class specified by STORCLAS= will be directly managed and cataloged as SMS-managed on the SMS-volume designated by TAPEX.

**21.09 FDRCOPY UNLIKE DEVICE EXAMPLES**

FDRCOPY can copy/move most types of data sets to a “unlike” disk device using a “logical” operation; for example, 3380 data sets can be moved to 3390 disks. Logical copy/move is automatically invoked when the output device type of a given data set differs from the type of the input disk. Special Considerations can be found in [sections 52.11, 52.14, and 52.15](#), and in member UNLIKE in the FDR ICL (Installation Control Library). For ICF VSAM in particular, refer to member VSAMUNLK in the ICL for considerations on moving clusters to smaller disks (3390 to 3380). Most of the examples in the preceding sections will work even if the output disk type is different from the input type. Following are some specific unlike move examples.

**MOVE DATASETS TO 3390**

MOVE 3380 datasets to a 3390 disk. The datasets will be cataloged to the output volume. All datasets will retain their original block sizes; they will be allocated with a size about equal in bytes to the original 3380 dataset. The selected datasets may include ICF VSAM clusters and non-VSAM datasets. Multi-volume VSAM clusters cannot be moved by this procedure, [See Section 52.11](#) for Multi-Volume VSAM Considerations.

```
//UNLI KE      EXEC   PGM=FDRCOPY, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//SYSI N       DD     *
      MOVE      TYPE=DSF, RECAT
      SELECT    CATDSN=TEST. **, NVOL=D3390X
/*
```

**MOVE DATASETS TO 3380**

MOVE PS and PO datasets from a 3390 disk to several 3380 disks (volsers starting with “D3380”). The datasets will be cataloged to their output volume. All PS (sequential) datasets will be reblocked to half-track blocking for maximum track utilization.

```
//UNLI KE      EXEC   PGM=FDRCOPY, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//SYSI N       DD     *
      MOVE      TYPE=DSF, RECAT, BLKF=2
      SELECT    DSN=**TEST**, VOL=D3390A, NVOL=D3380*, DSORG=(PS, PO)
/*
```

**MOVE ENTIRE 3380 TO 3390**

MOVE all datasets from a 3380 disk to several 3390 disks. In most cases, all the datasets on a 3380 fit on a 3390-2, but multiple 3390 output volumes are provided in case there is not room. All datasets will be cataloged to their output volume. All PS (sequential) datasets will be reblocked to half-track blocking for maximum track utilization; PO datasets will have their block size increased to half-track for new members. The selected datasets may include ICF VSAM clusters and non-VSAM datasets. Multi-volume VSAM clusters cannot be moved by this procedure, [See Section 52.11](#) for Multi-Volume VSAM Considerations.

```
//UNLI KE      EXEC   PGM=FDRCOPY, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//SYSI N       DD     *
      MOVE      TYPE=DSF, RECAT, BLKF=2
      SELECT    ALLDSN, VOL=D3380K, NVOL=(D3390A, D3390B, D3390C)
/*
```

## 21.20 FDRCOPY REORG COMMAND

**REORG****SIMREORG****TYPE=DSF****,DSNENQ=NONE / USE / HAVE****,ENQERR=NO****,ENQERR=BYPASS / PROCESS****,MAXCARDS=nnnnn****,MAXERR=nnnn****,SELTERR=NO / YES****REORG  
COMMAND**

The REORG command invokes FDRCOPY PDS reorganization (compression in-place), similar to the PDS compression of IEBCOPY, but with 50% to 90% less elapsed time and similar reduction in other resources used. For all DSORG=PO (partitioned) data sets selected, REORG will relocate all active members toward the beginning of the data set, leaving the maximum amount of unused space at the end of the PDS for new and updated members. An unlimited number of PDSs may be reorganized in execution of FDRCOPY from any number of disk volumes.

**SIMREORG  
COMMAND**

The SIMREORG command simulates the operation of the REORG command. SIMREORG must still read the input datasets to determine member location, but WRITES are simulated and the data sets will not be modified. SIMREORG will report on all selected data sets, indicating the number of tracks that a real REORG will reclaim.

**LICENSING  
REQUIRE-  
MENTS**

Although REORG is part of FDRCOPY, the REORG function is enabled only if your installation is licensed for FDRREORG, a separately-priced component of FDR.

FDRREORG ([See Section 25](#)) reorganizes VSAM data sets, IAM (Innovation Access Method) data sets, and PDSs (using FDRCOPY for the PDS reorganization). If you execute PDS reorganization through FDRREORG, it enhances the reorganization process by providing additional selection criteria, retrying unavailable datasets, etc.. However, these enhancements may add additional overhead; executing FDRCOPY REORG directly will provide the fastest PDS reorganization.

CONTINUED . . .

## 21.20 CONTINUED . . .

OPERANDS TYPE=DSF  
DSNENQ=

Required. Specifies that this is a dataset operation.

Specifies that FDRCOPY is to enqueue on the names of the data sets to be reorganized. It will issue an exclusive enqueue with a major name of SYSDSN and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, FDRCOPY will issue a warning message for the dataset and a U0888 ABEND will be issued at the end of FDRCOPY execution to call attention to the active dataset; the dataset will not be reorganized unless ENQERR=PROCESS was specified.

**USE** — The datasets will be enqueued for the duration of the reorganization. If not available, a warning message is issued and the dataset will not be enqueued.

**HAVE** — The datasets will be enqueued for the duration of the reorganization. If not available, FDRCOPY will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. If WAIT is specified, FDRCOPY will wait for the data set to become available. The job could time out. If NOWAIT is specified, FDRCOPY will print a warning message for the dataset and will not issue the enqueue. If RETRY is specified, FDRCOPY will attempt the enqueue again.

**NONE** — No dataset enqueue will be issued.

Default is USE.

**WARNING: DSNENQ=NONE or TEST (or a reply of NOWAIT to the FDRW27) will allow PDSs to be reorganized even while they are in use, which may cause failures in jobs or users who are reading them, and may cause FDRCOPY to fail if they are being updated.**

NOTE: If the data set is specified in a DD statement in the FDRCOPY job with DISP=SHR, DSNENQ= (other than NONE) will change the shared enqueue for the data set to EXCLUSIVE (DISP=OLD). The operator should respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.

CAUTION: This option should not be used on shared DASD unless a cross-system enqueue facility is available and the SYSDSN QNAME is broadcast across systems. Without this capability, FDRCOPY can only determine which datasets are active on the system it is running on.

ENQERR= **NO** — specifies that FDRCOPY will not set a condition code or ABEND at the end of execution if the DSNENQ= option is used (or DSNENQ=USE is defaulted) and a data set is found to be active.

Default is that FDRCOPY will issue the condition code or ABEND.

ENQERR= **BYPASS** — specifies that FDRCOPY will not reorganize a PDS if the DSNENQ= option is specified (or DSNENQ=USE is defaulted) and the PDS is found to be active.

**PROCESS** — specifies that FDRCOPY will reorganize a PDS even though it was found to be active by the DSNENQ= option. In this case, the message issued by FDRCOPY for the active dataset is strictly a warning.

**WARNING: ENQERR=PROCESS will allow PDSs to be reorganized even while they are in use, which may cause failures in jobs or users who are reading them, and may cause FDRCOPY to fail if they are being updated.**

However, dataset ENQ is not volume-specific; ENQERR=PROCESS may be appropriate if the dataset being reorganized is a duplicate of an active dataset on another volume.

Default is BYPASS.

NOTE: Both ENQERR=NO and ENQERR=BYPASS/PROCESS may be specified on the same REORG command.

CONTINUED . . .



## 21.20 CONTINUED . . .

<b>MAXCARDS=</b>	Enables FDRCOPY to accept additional SELECT/EXCLUDE commands. Default is a maximum of 250 commands.
<b>MAXERR=</b>	Specifies the number of read or write disk errors that are to be bypassed by FDRCOPY prior to ABENDING the operation. MAXERR may specify a value from 1 to 9999 errors. Read and write errors are counted separately, but MAXERR= specifies the maximum for each counter. See DIAGNOSTIC PROCESSING in <a href="#">Section 21.01</a> for the effect of errors and MAXERR= on FDRCOPY processing. Default is 20 errors.
<b>SELTERR=</b>	<b>NO</b> — specifies that FDRCOPY is not to issue a U0888 ABEND if a SELECT statement is not referenced. <b>YES</b> — specifies that FDRCOPY will issue a U0888 abend at the end of the REORG if any SELECT/EXCLUDE statement did not apply to any dataset on any disk. Default is YES unless overridden in the FDR/ABR global option table ( <a href="#">See Section 91 or 92</a> ).

## 21.21 SELECT/EXCLUDE COMMAND FOR REORG

**SELECT**    *DSN=filterCATDSN=filterDD=ddnameALLDSN*  
**S**            *,CATALOG=catname,MCATALOG=catname*

**EXCLUDE**    *,DSNENQ=NONE*  
**X**            *,DIRBLKS=nn,%DIRFREE=nn*  
              *,EMPTY=YES / NO*  
              *,LIST=YES / NO*  
              *,PRTALIAS*  
              *,VOL=vvvvvv*

**SELECT/  
EXCLUDE  
COMMAND  
for REORG**

The **SELECT** command selects the PDS (partitioned) datasets which will be reorganized. FDRCOPY will scan the VTOC of each input volume for datasets which match the parameters on a **SELECT** statements; data sets which are not DSORG=PO (PDS) will be bypassed. Datasets may be selected by fully-qualified dataset name or by using generic dataset name selection (DSN=), or by copying a dataset name from a DD statement (DD=). All datasets on an input volume may be selected (ALLDSN). Data sets may also be selected from the system catalogs by fully-qualified name or using a generic filter (CATDSN=).

The **EXCLUDE** command prevents certain datasets from being reorganized. The datasets to be excluded may be specified by fully-qualified name or by using generic dataset name selection (DSN=) or copied from a DD statement (DD=). The **EXCLUDE** command may be used to exclude particular datasets that would be selected by a more-encompassing **SELECT** statment. Since **SELECT/EXCLUDE commands are scanned in the order they are input, EXCLUDE commands should usually precede SELECT commands.**

**SELECT** and **EXCLUDE** commands will apply to all input disk volumes unless the **VOL=** parameter is specified.

**OPERANDS**    **DSN=**            Specifies a fully-qualified dataset name or a filter to be used for generic dataset selection, as described in [Section 52.16](#). This name or filter will be used when scanning the VTOCs of selected input volumes.

EXAMPLES:        DSN=USER1. JCL. CNTL  
                      DSN=\*\*LI ST  
                      DSN=PROD++. \*\*. LI B\*

**DD=**            Specifies that a data set name is to be taken from a DD statement. This operand must point to the DDNAME of a JCL statement. Using this option enables the user to specify a non-standard data set name.

EXAMPLE:         SELECT            DD=DD1  
                      //DD1        DD        DSN=USER. JCL, DI SP=SHR

CONTINUED . . .

## 21.21 CONTINUED . . .

<b>CATDSN=</b>	<p>Specifies a fully-qualified dataset name or a filter to be used for generic dataset selection from system catalogs, as described in <a href="#">Section 52.16</a>.</p> <p>If a fully-qualified name is specified, that name will be located in the system catalogs, and the volume serial(s) from the catalog become an implied VOL= parameter (if there are no DISKx DD statements pointing to those volumes, FDRCOPY will dynamically allocate and process them as input volumes).</p> <p>If a filter is specified, then ICF catalogs will be scanned for all cataloged datasets matching the filter, and they will be processed as if a SELECT CATDSN=dsname was present for each of them. It may be necessary to specify MAXCARDS=nnnnn if a large number of datasets are selected by the filter. Datasets which are obviously not PDSs (such as VSAM and GDGs) will not be selected from the catalog, but other non-PDS entries can not be excluded until later when the VTOC is processed on each volume. <b>Additional considerations for CATDSN=filter are explained in <a href="#">Section 52.16</a>.</b></p> <p>CATDSN= is supported only on SELECT statements.</p> <p>If the VOL= operand is also specified on a SELECT statement with CATDSN=, then only datasets cataloged to those volumes will be selected.</p> <p>EXAMPLES:      CATDSN=USER1. JCL. CNTL                         CATDSN=**COBOL                         CATDSN=PROD++ . ** . LI B*</p> <p>Normally CATDSN= will not display the datasets it selects from the catalogs, you will see the names only when ABR actually finds and selects the datasets in the VTOCs of the volumes they are cataloged to. To display all of the datasets selected specify PCATDSN=filter. However, PCATDSN may display datasets which are not selected because they are not PDSs.</p> <p>WARNING: depending on the filter specified, CATDSN= may need to search many catalogs.</p>
<b>ALLDSN</b>	<p>Specifies that FDRCOPY is to reorganize all PDSs on the volumes specified. DSN=** is equivalent to ALLDSN.</p> <p>NOTE: DSN=, CATDSN=, DD= and ALLDSN are mutually exclusive. One and only one of these operands must be specified on each SELECT or EXCLUDE card.</p>
<b>CATALOG=</b> <b>MCATALOG=</b>	<p>Specifies the name of a user catalog (CATALOG=) or alternate master catalog (MCATALOG=) to search when CATDSN= is specified. <a href="#">See Section 52.16</a> for details.</p> <p>Default is that the catalog search will start with the active master catalog. User catalogs will be searched if their assigned aliases match the CATDSN=filter.</p>
<b>DSNENQ=</b>	<p><b>NONE</b> — specifies that FDRCOPY is to bypass the data set enqueue for the selected datasets. May be used to override the DSNENQ= option on the REORG command.</p> <p><b>WARNING: DSNENQ=NONE will allow PDSs to be reorganized even while they are in use, which may cause failures in jobs or users who are reading them, and may cause FDRCOPY to fail if they are being updated.</b></p>

CONTINUED . . .

## 21.21 CONTINUED . . .

<b>DIRBLKS=</b>	<b>nn</b> — specifies that all PDSs processed by this SELECT statement will have their directories expanded by 'nn' directory blocks during the reorganization. 'nn' may be from 1 to 99. DIRBLKS= is designed to be used for a one-time expansion, if left on the SELECT it will expand the directories every time the REORG is run.
<b>%DIRFREE=</b>	<p><b>nn</b> — specifies that any PDS processed by this SELECT will have its directory expanded if less than 'nn' percent of the directory is currently unused (based on the number of directory blocks in use and the bytes used in the last or only block). Enough directory blocks will be added so that it does have nn% free directory space after REORG. For example, on a PDS with 95 directory blocks (5 blocks free), %DIRFREE=10 will expand it to 100 blocks (10 blocks free). 'nn' may be from 1 to 99. %DIRFREE= may be permanently specified on the SELECT since it will only expand directories which are short on free space.</p> <p>The default, if neither DIRBLKS= nor %DIRFREE= is specified, is that the directory size of selected PDSs will be unchanged.</p> <p>For both DIRBLKS= and %DIRFREE=, a maximum of one track's worth of directory blocks (e.g., 45 on a 3390) will be added to any PDS in one REORG execution; it is possible that several REORG executions will be necessary to fully expand some directories. Also, the directory will never be expanded beyond the end of the first extent (an MVS restriction), and the number of blocks added may be reduced (possibly to zero) if little or no unused space exists in the PDS before reorganization (the PDS itself will never be extended to make room for the expanded directory).</p>
<b>EMPTY=</b>	<p><b>YES</b> — empties the directory of the selected PDSs, so that they appear to have no members. The Last Block Pointer in the DSCB will point immediately after the directory. This may be used to empty PDSs without having to delete all members and reorganize (or delete and reallocate the PDS). This can be useful for emptying linklist data sets and others which are always active (DSNENQ=NONE may be required to REORG active data sets).</p> <p><b>NO</b> — selected PDSs will be reorganized normally.</p> <p>The default is NO.</p> <p><b>WARNING: EMPTY=YES should be used with caution since all members in the selected PDSs will be DELETED!</b></p>
<b>LIST=</b>	<p><b>YES</b> — For each selected PDS, all member names in the PDS are listed, indicating which members were moved.</p> <p><b>NO</b> — Member names are not listed.</p>
<b>PRTALIAS</b>	When used on a SELECT statement with CATDSN= will display all of the alias names and user catalogs that were searched.
<b>VOL=</b>	<p>Specifies the input disk volume serial(s) to which this SELECT/EXCLUDE command is to apply. It may specify a single serial (e.g., VOL=ABC123 or a group of volumes all starting with the same prefix (e.g., VOL=ABC*). If there are online disk volumes matching the VOL= value that are not pointed to by DISKx DD statements in the FDRCOPY step, FDRCOPY will automatically dynamically allocate them and process them as input volumes.</p> <p>Default: VOL= is specified, the SELECT/EXCLUDE command will apply to all input volumes.</p>

**21.22 FDRCOPY REORG EXAMPLES**

Reminder: the PDS reorganization functions shown here will not work unless your installation is licensed for FDRREORG, an extra-cost feature of FDR ([See Section 21.01](#)).

**REORGANIZE ONE PDS** A single PDS will be reorganized. Its volume will be extracted from the catalog. All member names will be listed showing which were moved.

```
//REORG      EXEC   PGM=FDRCOPY, REGI ON=2M
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
              REORG   TYPE=DSF
              SELECT  CATDSN=USER1. JCL. CNTL, LI ST=YES
/*
```

**REORGANIZE ONE PDS** This is a cataloged procedure that can be used to reorganize one or more PDS data sets.

The PDS name or a filter name is a symbolic parameter to the proc. The FDRCOPY control statements are passed in the EXEC statement PARM, so SYSIN is a DUMMY dataset.

```
//REORG      PROC    PDS=' NOT. GI VEN'
//REORG      EXEC    PGM=FDRCOPY, REGI ON=2M,
//              PARM=' REORG TYPE=DSF/SELECT CATDSN=&PDS'
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     DUMMY
//              PEND
```

Example: To reorganize all data sets with a high level index of USER1 and a last index level of LOAD specify:

```
//REORG      EXEC    REORG, PDS=' USER1. ** . LOAD'
```

To duplicate the first example with this proc, use:

```
//REORG      EXEC    REORG, PDS=' USER1. JCL. CNTL'
```

**REORGANIZE PDSs ON SPECIFIED VOLUMES** All PDSs on volumes starting with TSO will be reorganized. Datasets currently allocated to another job or user will be bypassed.

```
//REORG      EXEC    PGM=FDRCOPY, REGI ON=4M
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
              REORG   TYPE=DSF
              SELECT  DSN=**, VOL=TSO*
/*
```

CONTINUED . . .

## 21.22 CONTINUED . . .

**REORGANIZE  
MANY PDSs**

A number of cataloged PDSs, which may be on many volumes, will be reorganized. MAXCARDS= is specified in case over 250 datasets are selected. Datasets currently allocated to another job or user will be bypassed. Member names will be listed for all JCL libraries.

```
//REORG      EXEC    PGM=FDRCOPY, REGI ON=4M
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
              REORG   TYPE=DSF, MAXCARDS=1000
              SELECT  CATDSN=*. CNTL
              SELECT  CATDSN=*. JCL, LI ST=YES
              SELECT  CATDSN=PROD. **
/*
```

**REORGANIZE  
ENQ'ED PDSs**

REORG will normally bypass datasets which are ENQed (in use) by another job or user, but that ENQ is by dataset name, not volume serial. This job will reorganize PDSs on an alternate SYSRES volume even though a dataset by the same name is in use on the active SYSRES.

WARNING: ENQERR=PROCESS (or DSNENQ=NONE) must not be used to reorganize PDSs which are actually in use; they may become unusable.

```
//REORG      EXEC    PGM=FDRCOPY, REGI ON=2M
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
              REORG   TYPE=DSF, ENQERR=PROCESS
              SELECT  DSN=SYS**, VOL=ALTRES
/*
```

**SIMULATE  
REORGANIZA-  
TION**

A simulated reorganization of all PDSs on all online volumes will be done. Since FDRCOPY cannot determine the results of the reorganization without knowing the contents of the PDS, each selected PDS will be read, but all writes will be bypassed and no PDS will be changed. Note: This example may run for a long time since FDR will read all the PDS's in your installation.

```
//REORG      EXEC    PGM=FDRCOPY, REGI ON=2M
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
              SI MREORG TYPE=DSF
              SELECT  DSN=**, VOL=*
/*
```

## 25.01 FDRREORG OVERVIEW

**FDRREORG  
OVERVIEW**

FDRREORG will logically reorganize IAM and VSAM KSDS's or AIX's, and compress partitioned data sets, based on user specified exclusion and selection criteria. Data sets can be reorganized on an as needed basis using keywords that define the characteristics of data sets requiring reorganization. FDRREORG can also be run in simulation mode to obtain a report of those data sets meeting the users selection criteria.

**FDRREORG V5.2L50 ENHANCEMENTS**

FDRREORG V5.2L50 offers a number of new features to further improve the performance of reorganizing large IAM (enhanced format) and VSAM files.

- PARALLEL SEQUENTIAL READ for Multi-Volume file reduces reorg time by 30 to 70%.

Many users have IAM and VSAM files that exceed 1 GB in size. Some IAM files exceed 10GB. Reorganizing large files can take a very long time reducing their availability to online systems.

FDRREORG Parallel option backs up each volume of a multi-volume file concurrently to separate tape or disk files (up to a specified maximum). For example, if a file resides on 4 DASD volumes the backup time can be reduced by 75%.

- FDRREORG (as a default) bypasses the de-compression of IAM enhanced format files reducing reorg time by 20 to 40%.
- FDRREORG now supports the delete and re-define of IAM files during reorganization.

FDRREORG will attempt to obtain exclusive control of a data set during its reorganization. For IAM data sets, FDRREORG will issue the appropriate IAM enqueue's to lock out all updates to the data set while it is being reorganized. For VSAM data sets, FDRREORG will set the update inhibit indicator for the data component of the VSAM cluster being reorganized. If FDRREORG is unable to obtain exclusive control, the data set will be bypassed if the default DSNRETRY option is being used. FDRREORG can be instructed to retry data sets that were in use and can also issue the appropriate system enqueue's to process a data set when it becomes available. If it is critical that a particular data set or set of data sets be reorganized, FDRREORG can be instructed to wait for these data sets to become available.

All IAM or VSAM data sets selected for reorganization are backed up to either TAPE or DASD, and then immediately reloaded from the backup. The backups are logical backups obtained by using the standard access method interfaces. VSAM data sets with records that are larger than 32763 are not supported. The FDRREORG backups can be used to reload a data set using IDCAMS REPRO or any other standard file copy utility that supports VSAM data sets. **If you are creating compressed IAM backups, you must use the BACKUPCOMPRESSED IAM override to use the backup with IDCAMS REPRO. See the IAM manual for additional information.** The user has the option of creating the backup data sets as either standard sequential data sets or as GDG's. If GDG's are chosen, FDRREORG will dynamically define the base GDG to an ICF catalog if one does not already exist. GDG's cannot be used with the parallel backup option. The name of the backup data sets are generated dynamically from the target data set name using the BACKUPGROUP or BACKUPINDEX keywords to provide user control of the backup data set name. All backup data sets are cataloged after they have been created and will be uncataloged and deleted after the reload has completed if the backups are not to be kept. FDRREORG provides last tape support on a jobname basis for users who wish to have subsequent executions of the same reorg job append new backups to the last tape used in the last execution of FDRREORG.

FDRREORG provides complete dynamic allocation of all target and backup data sets. There are numerous keywords provided to allow the user to control the type and number of devices allocated by FDRREORG. Backups on tape will automatically be stacked up to the user specified MAXFILE value.

CONTINUED . . .

**25.01 CONTINUED . . .**

FDRREORG has a multi-tasking capability that can be activated by providing selection criteria that allows multiple volumes to be processed. Each volume selected for processing will be processed by a separate subtask. Up to 15 concurrent subtasks can be active provided there is sufficient virtual storage available within the region. To minimize the below 16M virtual storage requirements, VSAM buffers and control blocks will be allocated above the 16M line as appropriate for DFP releases 2.1 or higher. IAM provides this capability automatically for the backup and will provide it for the reload if BSAM mode has not been specified for IAM file load processing via the IAM global option table. For DF/SMS (any release), QSAM buffers used for the backup will also be allocated above the 16M line.

In order to minimize the manual effort required to recover from a failure during FDRREORG processing, a checkpoint and log file are created to record information that simplifies the recovery of a failed reorganization. The checkpoint file records information on the current status of all active file reorganizations and the log file is used to record information about unsuccessful reloads. FDRREORG's RECOVER command can dynamically allocate the checkpoint and log files and use the information in these files to complete reload processing for any or all of the data sets impacted by a system or FDRREORG failure.

<b>FDRREORG PERFORM- ANCE</b>	FDRREORG has been designed to provide capability and ease of use in reorganizing VSAM, IAM and PDS data sets without sacrificing performance. FDRREORG can reorganize simultaneously 1 to 15 volumes (default set at 4). FDRREORG gives users intelligent choices in reorganization. These features plus the special functions detailed in the following paragraphs give FDRREORG unrivalled performance and capability.
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<b>VSAM PERFORM- ANCE</b>	Normally, VSAM data sets must be deleted and defined before they can be reloaded by IDCAMS. FDRREORG does not need to delete and define most VSAM data sets even if they are marked NOREUSE. VSAM defaults to recovery on a load of a KSDS or AIX. This requires VSAM to preformat each CA prior to loading records into the CA. FDRREORG eliminates the need to reformat the CA's even if recovery is on.
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Most important for performance, FDRREORG calculates the optimal buffers required to sequentially read and reload the file.

FDRREORG reduces the wall clock, CPU and I/O operations required to reorganize your VSAM files by 20 to 60%.

<b>PDS PERFORM- ANCE</b>	FDR uses a proprietary technique to compress PDS data sets which reduces the wall clock, CPU and disk EXCPs to compress source libraries by 30 to 60% and load libraries by 80 to 98% as compared to IEBCOPY performing the compression. FDR is capable of compressing PDS's from many volumes without individual JCL and control statements.
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## 25.01 CONTINUED . . .

**SAMPLE PDS  
COMPRESSION  
TEST**

User compressed 479 PDS data sets using FDRCOPY REORG as compared to DF/DSS (executing IEBCOPY). Test was run on a 3090-400S using MVS/ESA 3.1.3 and DFP 3.2. Data sets occupied 33585 tracks on a 3380-K disk. A mix of source and load libraries were compressed.

	# DSN	ELAPSED	CPU	EXCPS
FDRCOPY	479	10.16M	16.01S	5197
DFDSS V2.5	479	164.39M	382.86S	447203
SAVINGS		93.8%	95.8%	98.8%

**COMPRESS  
LINKLIB AND  
SMPPTS**

User compressed SYS1.LINKLIB and SYS1.SMPPTS data sets on a 4381-91E CPU running MVS/ESA 4.2. FDRCOPY was compared to IEBCOPY.

		ELAPSED	CPU	EXCPS
	FDRCOPY	2.52M	7.92S	1136
SYS1.SMPPTS	IEBCOPY	4.50M	23.22S	6074
	SAVINGS	42.8%	65.8%	81.2%

		ELAPSED	CPU	EXCPS
	FDRCOPY	0.64M	2.97S	328
SYS1.LINKLIB	IEBCOPY	7.50M	60.51S	20574
	SAVINGS	91.5%	95.1%	98.4%

**REORG BASICS**

As shipped, FDRREORG has default criteria that should select those data sets that are in the most need of reorganization. Using the data set names or filters that you provide, FDRREORG will automatically reorganize the following data sets:

- 1) VSAM KSDS's that have taken control interval or control area splits in 10% or more of the total control intervals or control area's respectively, and have a CA and CI freespace value that is less than 50%.
- 2) IAM data sets that have used at least 90% of the independent overflow area (compatible format only), or that have at least 10% of the records in the file in the independent overflow area, or require more than 1 megabyte for the overflow index.
- 3) Partitioned data sets that are at least 90% full.

These defaults can be permanently changed or disabled by using the FDRREORG option change utility FDRREOZO. You can also override these defaults at run time by providing your own values.

Using the appropriate SELECT keywords, you can easily provide your own rules for selecting data sets for reorganization. We highly recommend that you use the SIMULATE command before running a REORG for the first time, or after making changes to an existing set of selection criteria. SIMULATE will produce a report of the data sets that would have been selected for reorganization had the REORG command been used. This report can be used to fine tune your selection parameters so only the data sets you want are selected for reorganization. Keep in mind that SIMULATE does not test the availability of the data sets selected. It is possible that any number of the data sets that meet your selection criteria will be in use by other jobs when the REORG command is run and will not be reorganized. FDRREORG performs a full file reload and must have exclusive control of a data set in order to reorganize it.

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## 25.01 CONTINUED . . .

**VSAM KSDS's  
AND AIX's**

Due to the nature of the insert strategy used by VSAM, KSDS's need to be reorganized from time to time. When records are inserted into a VSAM KSDS, there may be insufficient free space available in the control interval where the inserted record belongs. When this occurs, VSAM will "split" the control interval to insert the record. If there is insufficient free space in the control area to hold this split control interval, a control area split will also occur. Over time, and without periodic reorganization, these control interval and control area splits will eventually cause a degradation in performance, and in the case of control area splits, cause a waste of valuable DASD space.

FDRREORG can be used to logically reorganize these files on an as needed basis. By using either the default selection criteria or your own, **FDRREORG could be run on a daily basis against these files, and would only reorganize them when needed.** This is a much more efficient use of valuable computer resources than simply scheduling a file reorganization on a daily or weekly basis. With FDRREORG's approach, you can be certain that files will be reorganized when they meet your specified criteria, instead of by the best guess method you are probably using today.

FDRREORG supports any VSAM KSDS that has been defined with a maximum record length of 32,763 or less. For VSAM KSDS's that are the base cluster of one or more alternate indexes, FDRREORG will delete and define the base cluster and all associated AIX's and Path's. After the base cluster has been reorganized, FDRREORG will perform a fast build of all the related alternate indexes.

**IAM  
(INNOVATION  
ACCESS  
METHOD)**

IAM, Innovation's proprietary access method, provides a transparent replacement for many VSAM KSDS and ESDS applications. IAM provides improved performance, better space utilization, and built in data compression. FDRREORG completely reorganizes IAM files by placing all records from independent overflow and prime extension into prime data blocks. After reorganization, 100% of independent overflow and prime extension are available for inserts or adds.

By using the appropriate keywords, you can re-size independent overflow and prime extension for files in compatible format. This might be desirable if the IAM file was originally created with a single or dummy record load. IAM treats single or dummy record loads as a special case and dynamically increases the size of independent overflow and prime extension depending on the key of the record loaded. If you completely reorganize an IAM file, retaining the generous amounts of independent overflow and prime extension is in all likelihood inappropriate. Sometimes the generous amounts of independent overflow or prime extension may have been provided when the file was defined because it was not clear how much of these area's would be required. In other cases files may have been defined with insufficient independent overflow or prime extension. FDRREORG allows you to dynamically adjust the size of independent overflow and prime extension for these files. By using the PCTOFKEEPSINGLE keyword for files created with a single record load, and the PCTOFKEEPMULTIPLE keyword for files not created with a single record load, you can specify the percentage of independent overflow to retain during reorganization. To dynamically increase the size of independent overflow, specify a value greater than 100. The PCTPEKEEPSINGLE and PCTPEKEEPMULTIPLE keywords provide the same support for IAM's prime extension. IAM's file load has been enhanced to recognize that FDRREORG is re-loading the IAM file and will accept the temporary overrides to re-size independent overflow and prime extension. If the IAM file is subsequently re-loaded using whatever procedure is normally used to create this file, IAM will revert to the original sizes specified when the IAM file was defined. This ensures that your definition parameters will always be preserved.

**PARTITIONED  
DATA SETS**

When existing members of a partitioned data sets are updated, the partitioned data set access method (BPAM) stores the updated member at the end of the data set. The space occupied by previous versions of these updated members become dead space and can not be re-used unless the data set is compressed with a utility such as IEBCOPY. Over time, the PDS will eventually exhaust all the remaining free space and will have to be compressed before additional members can be added or updated members saved. FDRREORG can dynamically compress these data sets based on the default PDSFULL percentage of 90%, or using a value that you specify. If the PDS meets the specified PDSFULL percentage and the PDS has just been compressed, there will be no difference in the amount of available free space after FDRREORG has compressed the data set.

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## 25.01 CONTINUED . . .

**DATA SET  
INTEGRITY  
DURING  
REORGANI-  
ZATION**

To ensure that the data sets being reorganized can not be updated while a reorganization is taking place, FDRREORG will use techniques that are appropriate for the data sets access method to lock out updates by other jobs. FDRREORG will allocate all data sets using DISP=OLD.

Although this can be changed by using the IAMDISP, PDSDISP or VSAMDISP keywords, WE STRONGLY RECOMMEND THAT YOU ALLOW FDRREORG TO ALLOCATE USING DISP=OLD. For VSAM, FDRREORG will alter the files share options to 1,3 and set the update inhibit flag before starting the backup. If another job has the data set opened for update, FDRREORG will be unable to open the file. If this should occur, FDRREORG will restore the files share options, turn off the update inhibit flag, and bypass the data set. For IAM, FDRREORG will issue IAM's enqueue's before opening the data set. If exclusive control is not obtained, FDRREORG will bypass the data set. If you use GRS, or have a cross system enqueue product, we recommend that all IAM and VSAM enqueues be propagated if the data sets selected for reorganization can be in use on other systems in your complex.

**RECOVERING  
FROM A  
FAILED  
REORGANI-  
ZATION**

FDRREORG creates a checkpoint and log file when a REORG command is executed. If you have multiple REORG commands for a single execution of FDRREORG, the same checkpoint and log file will be used. In the event that one of FDRREORG's subtasks abends, the additional REORG commands will not be executed to preserve the information for the failed subtask. In the case of a failure for a single data set, this information will be kept in FDRREORG's log file. FDRREORG will in this case execute the remaining REORG commands, if any.

The data set names used for the checkpoint and log file contain the name of the job, the date the REORG command was started, and the time the REORG command was started. In the event of a subtask abend, FDRREORG abend, or system failure, the checkpoint will be kept and can be used with FDRREORG's RECOVER command. If none of these conditions occur, the checkpoint file will be deleted by FDRREORG when the job step ends. The log file will be kept if any file re-load failures have occurred. The log will also be kept if a system failure or FDRREORG abend occurs, although it is possible that the log file will be empty in this situation.

To actually recover from a failed REORG, execute FDRREORG with the RECOVER command and code the JOBNAME keyword specifying the name of the job that failed. FDRREORG's recovery processor will allocate the most recent matching checkpoint and log file for the jobname specified, and re-load any data sets that had started the re-load phase without completing. Data sets that failed during the backup phase will not be recovered because they are still loaded and usable.

**DATA SET  
AVAILABILITY  
AND THE  
DSNRETRY  
OPTION**

During the course of a reorganization run, it is possible that data sets selected for reorganization will be in use by other jobs. In many cases, these data sets will become available before FDRREORG completes. By using FDRREORG's DSNRETRY options, you can request that FDRREORG make additional attempts to reorganize these data sets. Depending on the importance you associate with reorganizing a particular data set or group of data sets, there are four options that can be specified to control retry processing.

For those data sets that should only be reorganized if they are available at the time FDRREORG first attempts to reorganize them, use DSNRETRY=NO (the default) on the SELECT statement.

For those data sets that you wish to reorganize if they should become available during the course of execution, use DSNRETRY=RETRY.

To improve FDRREORG's chances of successfully allocating an unavailable data set, use DSNRETRY=ENQ. With this option, FDRREORG will issue an ENQ for the data set. This data set will be the next data set processed if it should become available.

For those data sets where reorganization is critical, use DSNRETRY=WAIT. In addition to issuing the ENQ for these data sets, FDRREORG will wait for them to become available before terminating. If you use the WAIT option, we recommend that you specify the RUNTIME or STOPTIME keyword on the REORG statement, or use an operator STOP (P) command, to prevent FDRREORG from waiting indefinitely.

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## 25.01 CONTINUED . . .

**BACKUP  
DATA SETS**

In order for FDRREORG to reorganize VSAM and IAM data sets, it must create a logical backup of these data sets. This backup is used to reload the selected data set. The backup data sets created by FDRREORG are standard sequential data sets and can be used with IDCAMS REPRO. **If you are creating compressed IAM backups, you must use the BACKUPCOMPRESSED IAM override to use the backup with IDCAMS REPRO.** All of the backup data sets will have a record format of VBS and a logical record length of 32767. The block size will be an optimum block size for the backup device. The name of the backup data set is generated using the BACKUPGROUP or BACKUPINDEX specified on either the REORG or SELECT statement, or from the FDRREORG option table. To avoid having the backup data sets cataloged in your master catalog, be sure to define aliases for any high level indexes that you intend to use for FDRREORG backup data sets.

By default, FDRREORG will delete the backup data set after the target data set has been successfully reorganized. If you would like to keep FDRREORG's backup datasets, code BACKUP=PERM or BACKUP=GDG on either the REORG or SELECT statement, or use the option change utility FDRREOZO to change the default. GDG's cannot be used with the parallel backup option. When PERM is used, the name generated by applying the BACKUPGROUP or BACKUPINDEX is left cataloged. You must provide some method of deleting these data sets if FDRREORG is to be run again against the same target data sets. FDRREORG will not be able to reorganize a VSAM or IAM data set if a data set with the same name as the one generated for the backup data set already exists. The GDG option is probably more useful for retaining FDRREORG's backup data sets. With the GDG option, FDRREORG will use the name generated for the backup data set to define a generation data group (if one does not already exist), and will create the backup data sets as a +1 generation. When defining these generation datagroups, FDRREORG will use NOEMPTY, SCRATCH, and LIMIT(5). If you would prefer to use different parameters, you can use the GDGEMPTY, GDGNOSCRATCH, or GDGLIMIT keywords on the appropriate SELECT statement.

**LAST TAPE  
SUPPORT**

If you are using BACKUP=PERM or BACKUP=GDG and are creating your backup data sets on tape, you can direct FDRREORG to append new backups in subsequent runs to the same tapes. To do so, specify LASTAPE on the REORG statement. FDRREORG will create a catalog entry on a jobname and subtask basis that is used in next run of the same job to reuse these tapes. The data set name will be generated using either the default high level prefix in the FDRREORG option table which defaults to FDRREORG, or the prefix specified with the LASTAPEPREFIX keyword, followed by the jobname, TASKnn where nn is the taskid, and finally LASTAPE. The catalog entry will also contain the tape volume and the next file sequence number that will be used for this tape volume. In the event that the file sequence number of the last file created is either 255 or the same as the value specified with the MAXFILE keyword, no catalog entry will be created. This feature is not supported with parallel backups.

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## 25.01 CONTINUED . . .

**ERROR  
HANDLING**

FDRREORG has been designed to continue processing if an error occurs while reorganizing an individual data set. FDRREORG makes a distinction between environmental errors, system errors, and fatal internal errors. For a fatal internal error, FDRREORG will allow any in progress reorganizations to complete if possible, and terminate. For environmental and system errors, FDRREORG by default, will allow up to 99 of both types to occur before shutting down. Please keep in mind that this discussion applies to errors encountered while backing up and reloading data sets only. Any abends that occur in FDRREORG's main task will result in an immediate abnormal termination. Similarly, any abends that occur in FDRREORG's volume processor tasks will result in the immediate abnormal termination of that task. The remaining volume processor tasks will continue to run, although resources allocated to the failed task may not have been released.

To allow you to control how FDRREORG handles these errors, a number of keywords have been provided. For a volume processor subtask abend, FDRREORG by default will attempt to complete the active reorg function without the abended task and terminate. If there are additional REORG statements, they will not be processed. In addition, any data sets which would have been selected for reorganization on the volume being processed by the abended task will not be selected by the remaining tasks. If you would prefer that FDRREORG shutdown when a volume processor subtask abends, specify SUBTASKABEND=TERM on the REORG command. FDRREORG will allow all active reorganizations to complete and then terminate.

Environmental errors are categorized as errors related to the current availability of resources required to reorganize a single data set. Insufficient space during allocation of backup data sets is an example of an environmental error. FDRREORG will allow for up to 99 environmental errors. You can use the MAXENVERR keyword on the REORG command to change this value.

System errors are categorized as any system abend or as any error that prevents FDRREORG from completing a reorganization. I/O errors, GETMAIN failures, and other system service failures are examples of system errors. FDRREORG will allow for up to 99 system errors. You can use the MAXSYSERR keyword on the REORG command to change this value.

**IFANY and  
IFALL  
KEYWORDS**

In most cases, you would want a data set excluded from or selected for reorganization if any of the appropriate thresholds are met or exceeded. For those situations where a very stringent exclusion or selection process is desired, you may want all of the appropriate thresholds to be met or exceeded. The IFANY and IFALL keywords can be used to modify FDRREORG's evaluation of the following thresholds in just such a manner:

<u>IAM-Enhanced</u>	<u>IAM-Compatible</u>	<u>VSAM</u>	<u>PDS</u>
OVERFLOWINDEX	OFULL	CASPLITR	PDSFULL
PCTTRECO	OVERFLOWINDEX	CISPLITR	PDSEXTENTS
PEUDATAR	PCTTRECO		
	PEFULL		
	PEUDATAR		

By default, FDRREORG will evaluate these thresholds as if the IFANY keyword was specified on the EXCLUDE or SELECT statement. If you want all of these thresholds to be met or exceeded before a data set is excluded or selected, use the IFALL keyword on the EXCLUDE or SELECT statement. If you specify any other criteria on your exclude or select statement, they will all have to be satisfied as well.

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## 25.01 CONTINUED . . .

**DSN= and  
CATDSN=  
DIFFERENCES**

Although the end result is usually the same, your choice in using the DSN= versus the CATDSN= keyword can significantly impact FDRREORG's processing. Choosing between these two keywords is actually very simple once you understand the differences in FDRREORG's behavior when you choose one over the other.

The most significant difference between DSN and CATDSN relates to partitioned data sets. If you use CATDSN, uncataloged PDS's will never be selected. This does not apply to IAM or VSAM data sets because they must always be cataloged.

When CATDSN is used, FDRREORG scans the appropriate catalog(s) when the control cards are parsed and limits its volume processing to the volumes that match the filter or names you specify. Use of the VOL= keyword is optional and if specified is used to restrict the data sets to the volumes or volume groups you provide. The remaining selection criteria will not be evaluated until the volume is processed during the actual simulate or reorganization phase. Care should be taken when using the data set filtering capabilities because the data set names are kept in storage throughout simulate or reorg processing. Avoid coding statements such as CATDSN=\*\* without a restrictive volume list. Doing so would cause a very large data set list to be built which would most probably result in an abnormal termination of FDRREORG. CATDSN=\*\* also causes FDRREORG to read every available catalog which could take a considerable amount of time if there are a large number of user catalogs.

When DSN is used, a catalog scan does not occur. FDRREORG performs most of the exclusion and selection process when reading the volumes VTOC for IAM and PDS's, and the VVDS for VSAM. Catalog locates are issued for IAM and VSAM data sets for additional information after the data set and volume filtering is done. Because the primary source of information is the VTOC or VVDS, the VOL= keyword must be provided. Every volume that matches a volume or volume group in the volume list will be processed.

As a general rule, you should use the CATDSN keyword when the number of data sets that would be returned from the catalog scan are small, or the volume naming conventions in use at your installation do not translate well into volume groups. Use the DSN keyword when many data sets could be returned from the catalog scan, or you are more interested in processing particular volumes as opposed to specific data sets. If you have uncataloged partitioned data sets that you want to reorganize, you must use the DSN keyword.

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## 25.01 CONTINUED . . .

Sample Report compressing PDS data sets using the catalog and selecting all PDS data sets on TSO volumes.

```

• REORG      PDSDISP=SHR,DSTYPE=PDS
• SELECT     CATDSN=SMPE.**          ← CATALOG SELECTION
• SELECT     DSN=**,VOL=TS0*        ← SPECIFIC VOLUME SELECTION
•
• FDRR02     PROCESSING COMPLETED FOR VOLUME TS0005 - CODE=0000
•            DATASETS REORGANIZED=000028 - FAILED=000000 - IN USE=000000 - WARNINGS=000000 - PDS TRACKS RECLAIMED=001439
•            DATASETS BACKED UP  =000000 - FAILED=000000 - IN USE=000000

```

```
• FDRROO TOTAL VOLUMES PROCESSED=0015
• DATASETS REORGANIZED=000591 - FAILED=000000 - IN USE=000000 - WARNINGS=000000 - PDS TRACKS RECLAIMED=016490
• DATASETS BACKED UP =000000 - FAILED=000000 - IN USE=000000
•
•
•
```

**TOTAL NUMBER OF TRACKS  
RECLAIMED AFTER FDRREORG**

DATASET NAME	VOLUME	AM	STATUS	CISR	CASR	TRKS USED	TRKS ALOC	PCT USE	NUM EXT	RECORDS LOADED		TRKS USED	TRKS ALOC	PCT USE	NUM EXT
				%OFU	%PEU					DIRU	DIRA				
PAYROLL.TEST.LINKLIB	TS0001	P0	COMPRESSED	102	115	581	600	97	2	102	115	475	600	79	2
SMPE.SMPPTS	DLIB01	P0	COMPRESSED	251	500	6334	6696	95	1	251	500	5725	6696	85	1
USER.LOADLIB	TS0010	P0	COMPRESSED	436	1108	1061	1275	83	1	436	1108	932	1275	73	1
USER2.JCLLIB	TS0015	P0	ALREADY COMPRESS	35	40	11	15	73	1	35	40	11	15	73	1

↑

**DIRECTORY BLOCKS  
USED AND ALLOCATED**

↑

**TRACKS USED  
BEFORE FDRREORG**

↑

**TRACKS USED  
AFTER FDRREORG**

Sample Report of reorganizing VSAM data sets. The backup will be created as a GDG. Only data sets with either CI or CA split ratios greater than 4 will be reorganized.

REORG BACKUP=GDG															
SELECT CATDSN=(PROD.** ,SMPE.**),DSTYPE=VSAM,ALWAYSBACKUP,															
CASPLITR>4,CISPLITR>4															
DATASET NAME	VOLUME	AM	STATUS	CISR CASR		TRKS USED	TRKS ALOC	PCT USE	NUM EXT	RECORDS LOADED		TRKS USED	TRKS ALOC	PCT USE	NUM EXT
				%OFU DIRU	%PEU DIRA					DIRU	DIRA				
PROD.ACCTPAY.MASTER	PROD01	VS	REORGANIZED	13	27	55	55	100	10	5125		45	55	82	10
PROD.ACCTPAY.ALTMA SR	PROD01	VS	REORGANIZED	26	53	85	85	100	16	7367		50	85	59	16
PROD.HRIS.HISTORY	PROD02	VS	BACKED UP	0	0	450	480	100	1						
PROD.HRIS.EMPLOYEE.MASTER	PROD02	VS	REORGANIZED	49	47	95	95	100	18	10137		70	95	74	18
PROD.PAYROLL.MASTER	PROD03	VS	REORGANIZED	13	27	55	55	100	10	5226		45	55	82	10
PROD.PAYROLL.SUSPENSE	PROD03	VS	REORGANIZED	23	39	65	65	100	12	6124		45	65	69	12
SMPE.SP223.CSI	DLIB01	VS	REORGANIZED	5	16	1305	1350	97	1	99200	1125	1350	83	1	
SMPE.SP422.CSI	DLIB01	VS	REORGANIZED	2	6	780	900	87	1	65222	735	900	82	1	
SMPE.GLOBAL.CSI	DLIB01	VS	REORGANIZED	56	70	300	330	91	1	21805	150	330	45	1	

↑      ↑

**CI AND CA  
SPLIT RATIO**

↑

**NUMBER OF  
RECORDS LOADED**

**The ALWAYSBACKUP keyword causes this data set to be chosen by selection criteria but did not qualify for reorganization.**

## SAMPLE FDRREORG OUTPUT OF IAM DATA SETS

REORG															
SELECT CATDSN=PROD.BILLING.** ,DSTYPE=IAM															
DATASET NAME	VOLUME	AM	STATUS	CISR	CASR	TRKS USED	TRKS ALOC	PCT USE	NUM EXT	RECORDS LOADED		TRKS USED	TRKS ALOC	PCT USE	NUM EXT
				%OFU DIRU	%PEU DIRA					DIRU	DIRA				
PROD.BILLING.HISTORY	PROD04	IA	REORGANIZED	93	0	542	570	95	1	5356		581	615	95	2
PROD.BILLING.MASTER	PROD05	IA	REORGANIZED	100	0	7415	7500	99	6	78139		7309	7500	97	6
PROD.BILLING.PAYED	PROD03	IA	REORGANIZED	81	10	300	300	100	1	3487		300	300	100	1
PROD.BILLING.XCOLLECT	PROD05	IA	REORGANIZED	10	100	150	150	100	1	1853		140	150	93	1

PERCENTAGE OF  
OVERFLOW USED

↑

PERCENTAGE OF  
PRIME EXTENSION USED

↑

NUMBER OF  
RECORDS LOADED

↑



## 25.02 FDRREORG – The REORG and SIMULATE COMMAND

REORG REO	SIMULATE SIM	
,ALIASCHECK=CCC	,DSNRETRY=CCCCC	,MODE=CCCCCCCCC
,ALWAYSBACKUP	,DSTYPE=(type1,...typen)	,MOVEAIX=CCC
,BACKUP=CCCC	,EMPTYBACKUPS=CCCCC	,MSGLEVEL=C
,BACKUPALLOC=CCCC	,ENQERR=CCC	,MSGTIMESTAMP=CCC
,BACKUPDATACLASS=CCCCCCCCC	,IAMCOMPPERM=CCC	,NODEFAULTS
,BACKUPEXPDT=yyddd	,IAMCOMPTEMP=CCC	,NONSMS=CCCC
,BACKUPGROUP=CCCCCCCCC	,IAMDEFINE=CCC	,NOREORG
,BACKUPINDEX=CCCCCCCCC	,IAMDISP=CCC	,NOUPDATES=CCC
,BACKUPMGMTCLASS=CCCCCCCCC	,LASTAPEPREFIX=CCCCCCCCC	,OWNERSTRING=CCCC
,BACKUPRETPD=nnn	,LASTAPE	,PDSDISP=CCC
,BACKUPSTORCLASS=CCCCCCCCC	,LISTNOREORG=CCC	,RUNTIME=nnnn
,BACKUPSTRING=(old,new)	,LOGALLOC=CCCC	,SELTERR=CCC
,BACKUPUNIT=CCCCCCCCC	,LOGDATACLASS=CCCCCCCCC	,SIMPDSCOMP
,BACKUPUNITS=n	,LOGMGMTCLASS=CCCCCCCCC	,SMS=CCCC
,BUILDEMPYAIX=CCC	,LOGPREFIX=CCCCCCCCC	,SMSADDVOL
,CKPTALLOC=CCCC	,LOGSTORCLASS=CCCCCCCCC	,SORTRPT=CCC
,CKPTDATACLASS=CCCCCCCCC	,LOGUNIT=CCCCCCCCC	,STOPTIME=hhmm
,CKPTMGMTCLASS=CCCCCCCCC	,MAXENQ=nnn	,SUBTASKABEND=CCCC
,CKPTPREFIX=CCCCCCCCC	,MAXENVERR=nnnnn	,UPDATEDPDS=CCC
,CKPTSTORCLASS=CCCCCCCCC	,MAXFILE=nnn	,VSAMDEFINE=CCCCC
,CKPTUNIT=CCCCCCCCC	,MAXPARALLELBACKUPS=n	,VSAMDISP=CCC
,CONVERTINDEX	,MAXSYSERR=nnnnn	
,DATA=CCCC	,MAXTASKS=nn	

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## 25.02 CONTINUED . . .

**REORG COMMAND** Use this command to specify that REORG is to reorganize selected data sets.

**SIMULATE COMMAND** Use this command to specify that REORG is to report on data sets that would have been processed if REORG had been specified.

**OPERANDS** The following operands may be specified with the REORG or SIMULATE command.

**ALIASCHECK=ALIASC** Specifies if a check for an existing alias should be done prior to allocating a backup data set. If YES is specified and an alias does not exist, the backup or reorganization will not be performed. If NO is specified and an alias does not exist, the backup data set will be cataloged in the master catalog if the proper authority exists for the job.

**YES** – Check for an existing alias and fail the backup or reorganization if one does not exist.

**NO** – Do not check for an existing alias.

The default comes from the FDRREORG options table which is shipped set to YES.

**ALWAYSBACKUP ALWAYS** Specifies that a backup should always be taken of IAM or VSAM data sets that meet the general selection criteria but do not qualify for reorganization. When using this keyword, data sets will qualify for a backup when ALL CRITERIA EXCEPT THOSE LISTED BELOW are met:

<u>IAM-Enhanced</u>	<u>IAM-Compatible</u>	<u>VSAM</u>
OVERFLOWINDEX	OFULL	CASPLITR
PCTTRECO	OVERFLOWINDEX	CISPLITR
PEUDATAR	PCTTRECO	FREESPACE
	PEFULL	
	PEUDATAR	

This keyword can also be specified on the SELECT statement. Specify ALWAYSBACKUP at the SELECT level if you want to limit this option to specific data sets.

**BACKUP=** Defines the default disposition of the backup data sets after the target data set has been successfully reorganized. The value specified on the SELECT statement that selects the data set takes precedence.

**TEMP** – Backup data sets on DASD will be deleted and uncataloged. Backup data sets on TAPE will be uncataloged. If the LASTAPE option is specified, BACKUP=PERM will be forced.

**PERM** – Backup data sets on DASD will not be deleted and uncataloged. Backup data sets on TAPE will not be uncataloged.

**GDG** – Same as PERM except backup data sets will be a +1 generation data set. REORG will dynamically define any generation data groups that do not already exist. The high level qualifier of the dynamically generated generation data groups must be aliased to an ICF catalog.

GDG's are not supported for parallel backups.

The default is taken from the FDRREORG option table which is shipped set to TEMP.

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## 25.02 CONTINUED . . .

- BACKUPALLOC=** Defines the allocation method to use when allocating backup data sets.  
**BACKUPA** **SMS** – Allocate by SMS storage class.  
**UNIT** – Allocate by unit name.  
 The default is taken from the FDRREORG option table which is shipped set to UNIT.
- BACKUPDATACLASS=** Defines the default SMS data class for backup data sets. This operand can not be specified with BACKUPUNIT. The value specified on the SELECT statement that selects the data set takes precedence.  
**BACKUPD** The default for this keyword can be set in the FDRREORG option table.
- BACKUPEXPDT=** Defines the default expiration date to be used for all backup data sets. The value specified on the SELECT statement that selects the data set takes precedence. Specify a julian date of the form YYDDD or YYYYDDD.  
**BACKUPE**
- BACKUPGROUP=** Defines the default group name to be used to generate the names of the backup data sets. The number of characters specified will replace, left to right, characters in the target data set name. The value specified on the SELECT statement that selects the data set takes precedence. You can specify a special identifier of &RACFUID or &RACFGID to indicate that the RACF user id or RACF group id be used. See the description of the SELECT command for examples.  
**BACKUPG** You can specify a special identifier of &RACFUID or &RACFGID to indicate that the RACF user id or RACF group id be used.  
 If MODE=PARALLEL, you must place a single question mark somewhere in the specified string. The question mark is replaced by a letter starting with A to identify the multiple backups taken in parallel mode.  
 EXAMPLE: BACKUPGROUP=BKUP?  
 The generated backup dataset name will be the name of the selected dataset with BKUPA overlaying the first 5 characters of the first backup name, BKUPB will overlay the first 5 characters of the second backup name, and so on.
- BACKUPINDEX=** Defines the default pattern to be used to add or delete index levels when generating the backup data set name. REORG will use each index level specified in BACKUPINDEX in place of the original index level. If a period is specified without any characters following, the original index level will be copied to the backup data set name. If + is specified, the character following the + will be inserted into the backup data set name as a new index level. If ++ is specified, the characters following the ++ will be added to the end of the backup data set name as a new index level. If – is specified, the index level will be dropped from the backup data set name. The value specified on the SELECT statement that selects the data set takes precedence. You can specify a special identifier of &RACFUID or &RACFGID to indicate that the RACF user id or RACF group id be used. See the description of the SELECT command for examples.  
**BACKUPI** If MODE=PARALLEL, you must place a single question mark somewhere in the specified string. The question mark is replaced by a letter starting with A to identify the multiple backups taken in parallel mode.  
 EXAMPLE: BACKUPI NDEX=++BACKUP?  
 The generated backup dataset name will be the name of the selected dataset with .BACKUPA appended to the name of the first backup, .BACKUPB will be appended to the name of second backup, and so on.  
 The default is taken from the FDRREORG option table which is shipped set to ++BACKUP.

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## 25.02 CONTINUED . . .

- BACKUPMGMTCLASS=** Defines the default SMS management class for backup data sets. This operand can not be specified with BACKUPUNIT. The value specified on the SELECT statement that selects the data set takes precedence.  
**BACKUPM** The default for this keyword can be set in the FDRREORG option table.
- BACKUPRETPD=** Defines the default retention period to be used for all backup data sets. This operand can not be specified with BACKUPEXPDT. The value specified on the SELECT statement that selects the data set takes precedence.  
**BACKUPR** The default for this keyword can be set in the FDRREORG option table.
- BACKUPSTORCLASS=** Defines a valid SMS storage class which will be used to allocate SMS managed backup data sets when BACKUPALLOC is SMS. This operand can not be specified with BACKUPUNIT. The storage class specified with the REORG command will be used as the default storage class. The storage class specified on the SELECT statement that selects the data set, if any, takes precedence.  
**BACKUPS** The default for this keyword can be set in the FDRREORG option table.
- BACKUPSTRING=** Specifies an old string and a new string enclosed in parentheses to be used in generating the name of a backup data set. Only the first occurrence of the old string will be replaced by the new string. See the description of the SELECT command for examples.  
**BACKUPSTR** If MODE=PARALLEL, you must place a single question mark somewhere in the specified string. The question mark is replaced by a letter starting with A to identify the multiple backups taken in parallel mode.  
 Example: BACKUPSTRING=(CLUSTER, BACKUP?)  
 The generated backup dataset name will be the name of the selected dataset with BACKUPA replacing CLUSTER in the name of the first backup, BACKUPB will replace CLUSTER in the name of the second backup, and so on.
- BACKUPUNIT=** Defines a valid unit name containing tape or disk devices to be used for allocating backup data sets when BACKUPALLOC is UNIT. The unit name specified must not define a group of devices that contain a mixture of device classes (ie. 3480's and 3380's). It is allowed to use a unit name that defines a group of devices with a mixture of device models (ie. 3380's and 3390's). This operand can not be specified with BACKUPSTORCLAS.  
 The default is taken from the FDRREORG option table which is shipped set to SYSDA.
- BACKUPUNITS=** For backup data sets on tape, this operand defines the number of units to be allocated for backup data sets for each task. For backup data sets on disk, this operand defines the minimum number of units to be allocated for each backup data set. REORG will dynamically increase the number of disk units for a disk backup data set to ensure that sufficient space is available to backup the target data set.  
 The default is taken from the FDRREORG option table which is shipped set to 1.
- BUILDEMPTYAIX=** Specifies if FDRREORG should perform a build index on the empty alternate indexes of base clusters selected for reorganization.  
**YES** – Build empty alternate indexes.  
**NO** – Do not build empty alternate indexes.  
 The default is NO.

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## 25.02 CONTINUED . . .

<b>CKPTALLOC= CKPTA</b>	<p>Defines the allocation method to use when allocating the checkpoint data set.</p> <p><b>SMS</b> – Allocate by SMS storage class.</p> <p><b>UNIT</b> – Allocate by unit name.</p> <p>The default is taken from the FDRREORG option table which is shipped set to UNIT.</p>
<b>CKPTDATACLASS= CKPTD</b>	<p>Specifies the SMS data class to use for the checkpoint file when CKPTALLOC is SMS. This operand can not be specified with CKPTUNIT.</p> <p>The default can be set in the FDRREORG option table.</p>
<b>CKPTMGMTCLASS= CKPTM</b>	<p>Specifies the SMS management class to use for the checkpoint file when CKPTALLOC is SMS. This operand can not be specified with CKPTUNIT.</p> <p>The default can be set in the FDRREORG option table.</p>
<b>CKPTPREFIX= CKPTP</b>	<p>Specifies the high level qualifier to use when constructing the name of the checkpoint file. To make it possible for the RECOVER command to find the checkpoint file for a failed REORG, the checkpoint data set is cataloged with a name of &amp;CKPTPREFIX.REORGCKP.jobname.Dccyyddd.Thhmmss. You can specify a special identifier of &amp;RACFUID or &amp;RACFGID to indicate that the RACF user id or RACF group id be used.</p> <p>The default is taken from the FDRREORG option table which is shipped set to FDRREORG.</p>
<b>CKPTSTORCLASS= CKPTS</b>	<p>Specifies the SMS storage class to use for the checkpoint file when CKPTALLOC is SMS. This operand can not be specified with CKPTUNIT.</p> <p>The default can be set in the FDRREORG option table.</p>
<b>CKPTUNIT= CKPTU</b>	<p>Specifies a unit name containing disk devices to use for the checkpoint file when CKPTALLOC is UNIT. This keyword can not be specified with CKPTDATACLASS, CKPTMGMTCLASS, or CKPTSTORCLASS.</p> <p>The default is taken from the FDRREORG option table which is shipped set to SYSDA.</p>
<b>CONVERTINDEX</b>	<p>Directs FDRREORG to convert an imbedded index of a VSAM KSDS or AIX to noimbed if it is redefined with a dataclass that requires extended format. VSAM compaction or extended addressability require extended format. Without this keyword, FDRREORG will issue message FDRS63 and redefine the KSDS or AIX using the original define parameters.</p>
<b>DATA=</b>	<p>Specifies whether to use ALLOCATED or USED space for the CYLS and TRKS options of the EXCLUDE and SELECT sub commands.</p> <p><b>ALLOC</b> – Exclude/Select processing will use allocated space for CYLS or TRKS.</p> <p><b>USED</b> – Exclude/Select processing will use used space for CYLS or TRKS.</p> <p>The default is USED.</p>

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## 25.02 CONTINUED . . .

**DSNRETRY=**  
**DSNR** Defines the default action to take for data sets that are not available when they are selected for processing. The value specified on the SELECT statement that selects the data set takes precedence.

**NO** – The data set is bypassed.

**RETRY** – The data set will be added to the task's retry queue and periodic attempts will be made to allocate the data set. If the data set does not become available before the task completes its processing, the data set is bypassed.

**ENQ** – The data set will be added to the task's retry queue and an ENQ for the data set will be left pending. If the ENQ is not satisfied before the task completes its processing, the data set is bypassed.

**WAIT** – The data set will be added to the task's retry queue and an ENQ for the data set will be left pending. The task will wait for all data sets queue'd with the wait option before terminating. An operator STOP (P) command can be used to shutdown FDRREORG normally if it is no longer desirable to wait for data sets.

The default is NO.

**DSTYPE=** Specifies the type(s) of data sets to be considered for reorganization.

**IAM** – IAM data sets are eligible for reorganization.

**VSAM** – VSAM data sets are eligible for reorganization.

**PDS** – Partitioned data sets are eligible for reorganization (compression).

**ALL** – All data sets are eligible for reorganization.

PDS is ignored if MODE=PARALLEL.

The default is ALL.

**EMPTYBACKUPS=** Specifies if FDRREORG should keep the backups of previously loaded IAM or VSAM data sets that are now empty. Specifying KEEP is useful if the backups created by FDRREORG are retained as application backups and the current generation of each backup should reflect the current contents of all the data sets within that application.

**DELETE** – Empty backup data sets are deleted.

**KEEP** – Empty backup data sets are kept.

The default is DELETE.

**ENQERR=** Specifies if FDRREORG should set return code 8 if a data set selected for reorganization is in use by another job or user.

**YES** – Set return code 8 if a data set is in use.

**NO** – Do not set return 8 if a data set is in use.

**IAMCOMPPERM=**  
**IAMCOMPP** Specifies if FDRREORG should backup compressed IAM datasets in compressed format when BACKUP=GDG or BACKUP=PERM has been specified.

**YES** – Backups will be in compressed format.

**NO** – Backups will not be in compressed format.

The default is taken from the FDRREORG option table which is shipped set to NO.

Note – This feature requires IAM 6.3 and above and is only supported for files in enhanced format.

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## 25.02 CONTINUED . . .

- IAMCOMPTEMP=**  
**IAMCOMPT** Specifies if FDRREORG should backup compressed IAM datasets in compressed format when BACKUP=TEMP has been specified.
- YES** – Backups will be in compressed format.
- NO** – Backups will not be in compressed format.
- The default is taken from the FDRREORG option table which is shipped set to YES.
- Note – This feature requires IAM 6.3 and above and is only supported for files in enhanced format.
- IAMDEFINE=**  
**IAMDEF** Specifies if FDRREORG should delete and define IAM datasets that will be reorganized.
- YES** – IAM datasets will be deleted and defined before reloading.
- NO** – IAM datasets will not be deleted and defined before reloading.
- The default is taken from the FDRREORG option table which is shipped set to NO.
- Note – This feature requires IAM 6.3 or above. Additionally, files defined with an earlier release of IAM will not be redefined by FDRREORG until they are first redefined with IAM 6.3 or above.
- IAMDISP=**  
**IAMD** Specifies the disposition REORG is to use when allocating IAM data sets to be reorganized.
- OLD** – IAM data sets will be allocated DISP=OLD.
- SHR** – IAM data sets will be allocated DISP=SHR.
- The default and recommended value is OLD !
- LASTAPEPREFIX=**  
**LASTAPEP** Specifies the high level qualifier to be used when cataloging or locating the special LASTAPE catalog entries. You can specify a special identifier of &RACFUID or &RACFGID to indicate that the RACF user id or RACF group id be used.
- The default is taken from the FDRREORG option table which is shipped set to FDRREORG.
- LASTAPE** Requests that the REORG processor append new backup data sets to the tape volumes used in a prior run. At the end of a successful run, a data set will be cataloged for each task of the form &LASTAPEPREFIX.jobname.TASKnn.LASTAPE. The catalog entry identifies the last volume used and the next file sequence number to use. If the next file to be backed up would have gone to a new tape, no LASTAPE will be cataloged. Use of this option requires the BACKUP operand to be specified as either PERM or GDG. If BACKUP=TEMP is specified or defaulted, it will be forced to PERM.
- This option is not supported if MODE=PARALLEL.
- LISTNOREORG=**  
**LISTNOR** Defines the NOREORG list print option.
- YES** – The NOREORG list is printed for REORG or SIMULATE functions.
- NO** – The NOREORG list is not printed.
- The default is taken from the FDRREORG option table which is shipped set to YES.

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## 25.02 CONTINUED . . .

<b>LOGALLOC=</b> <b>LOGA</b>	<p>Defines the allocation method to use when allocating the log data set.</p> <p><b>SMS</b> – Allocate by SMS storage class. <b>UNIT</b> – Allocate by unit name.</p> <p>The default is taken from the FDRREORG option table which is shipped set to UNIT.</p>
<b>LOGDATACLASS=</b> <b>LOGD</b>	<p>Specifies the SMS data class to use for the log file when LOGALLOC is SMS. This keyword can not be specified with LOGUNIT.</p> <p>The default can be set in the FDRREORG option table.</p>
<b>LOGMGMTCLASS=</b> <b>LOGM</b>	<p>Specifies the SMS management class to use for the log file when LOGALLOC is SMS. This keyword can not be specified with LOGUNIT.</p> <p>The default can be set in the FDRREORG option table.</p>
<b>LOGPREFIX=</b> <b>LOGP</b>	<p>Specifies the high level qualifier to use when constructing the name of the log file. To make it possible for the RECOVER command to find the log file, the log data set is cataloged with a name of &amp;LOGPREFIX.REORGLOG.jobname.Dccyyddd.Thhmmss. You can specify a special identifier of &amp;RACFUID or &amp;RACFGID to indicate that the RACF user id or RACF group id be used.</p> <p>The default is taken from the FDRREORG option table which is shipped set to FDRREORG.</p>
<b>LOGSTORCLASS=</b> <b>LOGS</b>	<p>Specifies the SMS storage class to use for the log file when LOGALLOC is SMS. This keyword can not be specified with CKPTUNIT.</p> <p>The default can be set in the FDRREORG option table.</p>
<b>LOGUNIT=</b> <b>LOGU</b>	<p>Specifies a unit name containing disk devices to use for the log file when LOGALLOC is UNIT. This keyword can not be specified with LOGDATACLASS, LOGMGMTCLASS, or LOGSTORCLASS.</p> <p>The default is taken from the FDRREORG option table which is shipped set to SYSDA.</p>
<b>MAXENQ=</b>	<p>Specifies the maximum number of outstanding enqueue's allowed for the DSNRETRY ENQ and WAIT options for each volume processor task. When this limit is reached, data sets will be added to task retry queue as if the RETRY option was specified. The enqueue will be issued when the outstanding enqueue count falls below this maximum. Once the volume processor task has completed processing all volumes and is waiting for data sets queued with the WAIT option, no additional enqueue's will be issued.</p> <p>The default is taken from the FDRREORG option table which is shipped set to 999.</p>
<b>MAXENVERR=</b> <b>MAXENV</b>	<p>Specifies the maximum number of environmental errors allowed. When this limit is reached, all subtasks will terminate after processing the currently active data set. No additional REORG or SIMULATE commands will be processed. Environmental errors are any backup or re-load failures not caused by a system abend. Insufficient space, or target data set not available, are examples of environmental errors.</p> <p>The default is taken from the FDRREORG option table which is shipped set to 99.</p>

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## 25.02 CONTINUED . . .

<b>MAXFILE=</b>	<p>Specifies the maximum number of backup files to place on a single tape volume.</p> <p>The default is taken from the FDRREORG option table which is shipped set to 255.</p>
<b>MAXPARALLELBACKUPS=</b> <b>MAXP</b>	<p>Specifies the maximum number of concurrent backups for each dataset when <b>MODE=PARALLEL</b> has been specified. For an individual dataset, FDRREORG will additionally limit the number of concurrent dataset backups to the number of <b>USED</b> volumes. You may specify a value between 2 and 9.</p> <p>The default is 2.</p>
<b>MAXSYSERR=</b> <b>MAXS</b>	<p>Specifies the maximum number of system abends allowed. When this limit is reached, all subtasks will terminate after processing the currently active data set. No additional REORG or SIMULATE commands will be processed.</p> <p>The default is taken from the FDRREORG option table which is shipped set to 99.</p>
<b>MAXTASKS=</b> <b>MAXT</b>	<p>Specifies the maximum number of concurrent volumes to be processed. You may specify any number from 1 to 15, inclusive. Please note that the actual number of subtasks possible is limited by the amount of available virtual storage. For simulate commands with <b>MAXTASKS=15</b> a region size of 3 megabytes should be sufficient on an XA or ESA system. For REORG commands with <b>MAXTASK=15</b>, a region size of 8.5 megabytes should be sufficient on an XA or ESA system if only VSAM or IAM files are processed. If PDS data sets are compressed about 1.2 megabytes per <b>SUBTASK=</b> is required.</p> <p>The default is taken from the FDRREORG option table which is shipped set to 4.</p>
<b>MODE=</b>	<p>Specifies the concurrent dataset backup mode.</p> <p><b>ALL</b> – All datasets are processed.</p> <p><b>PARALLEL</b> – Only IAM and VSAM datasets with more than one <b>USED</b> volume are processed. FDRREORG will create multiple backup tasks to backup specific portions of the dataset. Use the <b>MAXPARALLELBACKUPS</b> keyword to specify the number backups per dataset.</p> <p><b>NOTE</b> – PDS's are bypassed in parallel mode.</p> <p><b>SINGLE</b> – Compresses PDS's and processes IAM and VSAM datasets not supported by parallel mode. This option is intended to be used to complement those jobs run with <b>MODE=PARALLEL</b>. All datasets which will not be processed in parallel mode will be processed in single mode.</p> <p>The default is <b>ALL</b>.</p>
<b>MOVEAIX=</b>	<p>Specifies if the alternate index data set(s) should be moved if the base cluster is moved.</p> <p><b>YES</b> – The alternate index data set(s) are defined using the <b>NEWVOLSDATA</b> and <b>NEWVOLSINDEX</b> specified for the base cluster.</p> <p><b>NO</b> – The alternate index data set(s) are defined on the original volumes.</p> <p>The default is <b>NO</b>. <b>YES</b> will be forced if a <b>NONSMS</b> managed cluster is redefined as an <b>SMS</b> managed cluster or if an <b>SMS</b> managed cluster is redefined a <b>NONSMS</b> managed cluster.</p>

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<b>MSGLEVEL=</b> <b>MSGL</b>	<p>Specifies the lowest level message type to be displayed on the subtask print file which has the ddname REORGPRT.</p> <p><b>I</b> – Informational, warning, and error messages will be displayed.  <b>W</b> – Warning and error messages will be displayed  <b>E</b> – Only error messages will be displayed.</p> <p><b>The default is taken from the FDRREORG option table which is shipped set to I.</b></p>
<b>MSGTIMESTAMP=</b> <b>MSGT</b>	<p>Specifies whether messages written to REORGPRT will be suffixed with the current date, time, and the internal subtask id that issued the message. If YES is requested or defaulted, the LRECL of the REORGPRT file is increased to 151.</p> <p>Note: Specify NO if you do not have a printer capable of printing 150 characters per line.</p> <p><b>YES</b> – Messages will be timestamped.  <b>NO</b> – Messages will not be timestamped.</p> <p>The default is taken from the FDRREORG option table which is shipped set to YES.</p>
<b>NODEFAULTS</b>	<p>If specified, the default <b>selection criteria</b> from the FDRREORG option table will not be used when evaluating SELECT statements.</p> <p>Note: You should specify this option if you want data sets to be selected based only on the keywords you specify.</p>
<b>NONSMS=</b>	<p>Specifies if FDRREORG's internal define should keep the current management status and volumes for NONSMS managed datasets or let the SMS ACS routines decide.</p> <p><b>KEEP</b> – NONSMS managed datasets are redefined as NONSMS managed datasets.  <b>SMS</b> – The installation SMS ACS routines will decide if the dataset should be defined as a managed dataset.</p>
<b>NOREORG</b>	<p>Specifies that selected data sets should be backed up but not reorganized.</p> <p>This keyword can also be specified on the SELECT statement. Specify NOREORG at the SELECT level if you want to limit this option to specific data sets.</p>
<b>NOUPDATES=</b> <b>NOUP</b>	<p>Specifies the action to take for IAM or VSAM data sets selected for reorganization that have had no adds, no deletes, and no updates.</p> <p><b>YES</b> – The data set will be reorganized.  <b>NO</b> – The data set will not be reorganized.</p> <p>The default is taken from the FDRREORG option table which is shipped set to NO.</p>

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## 25.02 CONTINUED . . .

<b>OWNERSTRING=</b> <b>OWN</b>	<p>Specifies a string of up to four characters which will be used as an eye catcher in the ownerid of the data component of a VSAM KSDS. REORG will update the ownerid field of the data component's catalog entry to record information used to insure data set integrity and to identify data sets that were being processed by REORG when either a system failure occurred, or REORG was canceled or otherwise terminated. See the RECOVER command for additional information.</p> <p>The default is taken from the FDRREORG option table which is shipped set to FDR\$.</p>
<b>PDSDISP=</b> <b>PDSD</b>	<p>Specifies the disposition REORG is to use when allocating partitioned data sets to be compressed.</p> <p><b>OLD</b> – Partitioned data sets will be allocated DISP=OLD. <b>SHR</b> – Partitioned data sets will be allocated DISP=SHR.</p> <p>The default value is OLD.</p>
<b>RUNTIME=</b> <b>RUN</b>	<p>Defines the number of minutes that this REORG or SIMULATE statement is allowed to run. When this limit is reached, processing for all active data sets is completed and the next REORG or SIMULATE statement, if any, is processed.</p>
<b>SELTERR=</b>	<p>Specifies if FDRREORG should set a return code of 8 if no data sets are selected by REORG or SIMULATE. Due to the nature of the selection process and the selection criteria specified, this may be a natural occurrence.</p> <p><b>YES</b> – Set return code 8 if no data sets are selected <b>NO</b> – Do not set return code 8 if no data sets are selected.</p> <p>The default is taken from the FDRREORG option table which is shipped set to YES.</p>
<b>SIMPDSCOMP</b>	<p>If specified on a SIMULATE command, requests that a simulated compression be performed on partitioned data sets. Please note that all selected partitioned data sets will be read to perform a simulated compression.</p>
<b>SMS=</b>	<p>Specifies if FDRREORG's internal define should keep the current management status and volumes for SMS managed datasets or let the SMS ACS routines decide.</p> <p><b>KEEP</b> – SMS managed datasets are redefined as SMS managed datasets on the same volumes. If you are running DF/SMS 1.3 or above, only the first volume will be the same. <b>SMS</b> – The installation SMS ACS routines will decide if the dataset should be defined as a managed dataset. SMS will select the volumes used to define the dataset.</p> <p>Note – If the SMS ACS routines indicate that a currently SMS managed dataset should not be redefined as SMS managed, FDRREORG will force SMS=KEEP if NEWVOLSDATA and NEWVOLINDEX were not specified.</p>
<b>SMSADDVOL</b>	<p>Directs FDRREORG to dynamically add an SMS dummy candidate volume for SMS managed datasets before starting the reload. If more space is required during the reload than is available on the current volume(s), the candidate volume will be converted to a real volume and the reload should be able to complete without an out of space error. If the volume is not used, FDRREORG will remove it.</p> <p>Note – This feature is not supported for IAM datasets defined with guaranteed space.</p>

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## 25.02 CONTINUED . . .

**SORTRPT=**  
**SORTR** Specifies the sorting option for the report written to REORGRPT. Specifying YES requires that information related to each data set processed or selected be kept in storage until the function is completed. Because this might require a significant amount of virtual storage, this option is only supported for MVS/XA or MVS/ESA systems.

**YES** – Report is produced at the end of a REORG, SIMULATE or RECOVER function in data set name and volser order.

**NO** – Report is produced as data sets are processed or selected.

The default is taken from the FDRREORG option table which is shipped set to NO.

**STOPTIME=**  
**STOP** Defines a time in hours and minutes (hhmm or hh.mm) that processing for this command is to stop. When this time is reached, processing for all active data sets is completed and the next REORG or SIMULATE statement, if any, is processed.

**SUBTASKABEND=**  
**SUBTASKA** Specifies the action to take if a volume processor subtask abends.

**CONT** – Continue processing without the subtask.

**TERM** – Quiesce all active work and terminate.

The default is taken from the FDRREORG option table which is shipped set to CONT.

**UPDATEDPDS=** Specifies the action to take for partitioned data sets that do not have a current backup. If the update indicator is on in a data sets format 1 DSCB, the data set is considered to not have a current backup.

**YES** – The data set will be compressed.

**NO** – The data set will not be compressed.

The default is taken from the FDRREORG option table which is shipped set to YES.

**VSAMDEFINE=**  
**VSAMDEF** Specifies when FDRREORG should delete and define VSAM KSDS's that will be reorganized.

**ALWAYS** – VSAM KSDS's are always deleted and defined before reloading.

**IFREQ** – Only VSAM KSDS's that cannot be reused will be deleted and defined before reloading.

**NO** – Disables delete and define of all VSAM KSDS's. KSDS's that cannot be reused will not be reorganized.

This keyword can also be specified on the SELECT statement.

The default is taken from the FDRREORG option table which is shipped set to IFREQ.

**VSAMDISP=**  
**VSAMD** Specifies the disposition REORG is to use when allocating VSAM data sets to be reorganized.

**OLD** – VSAM data sets will be allocated DISP=OLD.

**SHR** – VSAM data sets will be allocated DISP=SHR.

The default and recommended value is OLD !

## 25.03 FDRREORG – KEYWORDS AND OPTIONS – The EXCLUDE COMMAND

**EXCLUDE  
EX****ALL DATA SETS**

<b>,CRDAYS=nnn</b>	<b>,IFANY</b>
<b>,CRDATE=YYDDD YYYYDDD</b>	<b>,LRDAYS=nnnn</b>
<b>,CYLS=nnnn</b>	<b>,LRDATE=YYDDD YYYYDDD</b>
<b>,DSN=(dsn1,...dsn)</b>	<b>,TRKS=nnnnnn</b>
<b>,DSTYPE=(cccc,...cccc)</b>	<b>,VOL=(vol1,...voln)</b>
<b>,IFALL</b>	

**VSAM DATA SETS ONLY**

<b>,CASPLITR=nnn</b>	<b>,NCASPLITS=nnn</b>
<b>,CISPLITR=nnn</b>	<b>,NCISPLITS=nnn</b>
<b>,FREESPACE=nnn</b>	

**IAM DATA SETS ONLY**

<b>,OFULL=nn</b>	<b>,PEFULL=nn</b>
<b>,ORECS=nnnnnn</b>	<b>,PEBLKS=nnnnnn</b>
<b>,OVERFLOWINDEX=nnnnnnnnnn</b>	<b>,PEUDATAR=nnnnnn</b>
<b>,PCTTRECO=nnn</b>	

**PDS's ONLY**

<b>,PDSEXTENTS=nn</b>	<b>,PDSFULL=nn</b>
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CONTINUED . . .

## 25.03 CONTINUED . . .

**EXCLUDE COMMAND** Use this command to specify exclusion thresholds for REORG or SIMULATE processing. An EXCLUDE command applies to all SELECT commands that follow it. If any of the thresholds specified for an EXCLUDE are satisfied, the data set or volume will be bypassed.

**OPERANDS** The following operands may be specified with EXCLUDE to restrict REORG or SIMULATE processing.

**CASPLITR=CA** Defines the ratio of Control Area splits to every 100 Control Area's in a VSAM KSDS.

This operand supports the following logical operators. =,≠,>,>=,<,<=

**CISPLITR=CI** Defines the ratio of Control Interval splits to every 100 Control Interval's in a VSAM KSDS.

This operand supports the following logical operators. =,≠,>,>=,<,<=

**CRDAYS=** Defines the number of days since a file was created.

This operand supports the following logical operators. =,≠,>,>=,<,<=

**CRDATE=** Defines the day a file was created. Specify a julian date of the form YYDDD or YYYYDDD.

This operand supports the following logical operators. =,≠,>,>=,<,<=

**CYLS=** Defines the size of a data set in Cylinders. Allocated or used space will be used as requested by the DATA= operand of the REORG or SIMULATE command.

This operand supports the following logical operators. =,≠,>,>=,<,<=

**DSN=** Specifies a list of up to 50 data set names or data set filters to exclude. Refer to [Section 52.16](#) for information on specifying a data set filter.

**DSTYPE=DST** Specifies the type(s) of data sets to be excluded.

**IAM** – IAM data sets are excluded.

**VSAM** – VSAM data sets are excluded.

**PDS** – Partitioned data sets are excluded.

**ALL** – All data sets are excluded.

**The default is ALL.**

**FREESPACE=FREEP** Defines the VSAM CA or CI free space percent. This keyword is used to prevent reorganizations of VSAM KSDS's or AIX's that have very high free space percentages. To reduce splits for some files in online systems, some VSAM files are loaded with little or no free space and then altered to have a very high CA and/or CI freespace percent. If these files are processed by FDRREORG, the current freespace percentage is used resulting in a dramatic increase in space.

This operand supports the following logical operators. =,≠,>,>=,<,<=

CONTINUED . . .

## 25.03 CONTINUED . . .

**IFALL**

Specifies that all of the criteria that measure the level of disorganization within a data set need to be satisfied in order to exclude a data set. This keyword applies to the following keywords only:

<u>IAM-Enhanced</u>	<u>IAM-Compatible</u>	<u>VSAM</u>	<u>PDS</u>
OVERFLOWINDEX	OFULL	CASPLITR	PDSFULL
PCTTRECO	OVERFLOWINDEX	CISPLITR	PDSEXTENTS
PEUDATAR	PCTTRECO		
	PEFULL		
	PEUDATAR		

IFANY is the default.

**IFANY**

Specifies that any of the criteria that measure the level of disorganization within a data set need to be satisfied in order to exclude a data set. This keyword applies to the following keywords only:

<u>IAM-Enhanced</u>	<u>IAM-Compatible</u>	<u>VSAM</u>	<u>PDS</u>
OVERFLOWINDEX	OFULL	CASPLITR	PDSFULL
PCTTRECO	OVERFLOWINDEX	CISPLITR	PDSEXTENTS
PEUDATAR	PCTTRECO		
	PEFULL		
	PEUDATAR		

**LRDAYS=**

Defines the number of days since a data set was last referenced.

This operand supports the following logical operators. =,≠,>,≥,<,<=

**LRDATE=**

Defines the date that the data set was last referenced. Specify a julian date of the form YYDDD or YYYYDDD.

This operand supports the following logical operators. =,≠,>,≥,<,<=

**NCASPLITS=  
NCA**

Defines the number of Control Area splits.

This operand supports the following logical operators. =,≠,>,≥,<,<=

**NCISPLITS=  
NCI**

Defines the number of Control Interval splits.

This operand supports the following logical operators. =,≠,>,≥,<,<=

**OFULL=  
OF**

Defines the percent of overflow area used in an IAM file in compatible format.

This operand supports the following logical operators. =,≠,>,≥,<,<=

**ORECS=  
OR**

Defines the number of records that have been allocated for the IAM overflow area for files in compatible format.

This operand supports the following logical operators. =,≠,>,≥,<,<=

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## 25.03 CONTINUED . . .

<b>OVERFLOWINDEX=</b>	Specifies the amount of memory in bytes required for the in storage IAM overflow index.  This operand supports the following logical operators. =,-F,>,>=,<,<=
<b>PCTTRECO=</b>	Defines the percent of total records in an IAM file that are in the IAM overflow area.  This operand supports the following logical operators. =,-F,>,>=,<,<=
<b>PDSFULL=</b> <b>PDSF</b>	Defines the percent of allocated space used by a PDS.  This operand supports the following logical operators. =,-F,>,>=,<,<=
<b>PDSEXTENTS=</b> <b>PDSEX</b>	Defines the number of extents for a PDS.  This operand supports the following logical operators. =,-F,>,>=,<,<=
<b>PEBLKS=</b> <b>PEB</b>	Defines the number of blocks that have been allocated for the IAM prime extension for files in compatible format.  This operand supports the following logical operators. =,-F,>,>=,<,<=
<b>PEFULL=</b> <b>PEF</b>	Defines the percent of the prime extension area used in a IAM file in compatible format.  This operand supports the following logical operators. =,-F,>,>=,<,<=
<b>PEUDATAR=</b> <b>PEUD</b>	Defines the ratio times 100 of used prime extension blocks to prime data blocks in an IAM file.  This operand supports the following logical operators. =,-F,>,>=,<,<=
<b>TRKS=</b>	Defines the size of data set in tracks. Allocated or used space will be used as specified by the DATA= operand of REORG or SIMULATE.  This operand supports the following logical operators. =,-F,>,>=,<,<=
<b>VOL=</b>	Specifies a list of up to 50 volumes or volume groups. A volume group is specified by coding an asterisk at the end of the volser prefix (ie. VOL=PROD*). Use VOL=* to specify all volumes.



## 25.04 FDRREORG – KEYWORDS AND OPTIONS – The SELECT COMMAND

SELECT                   ,DSN=(dsn1,...dsnn)                   ,VOL=(vol1,...voln)  
S                       ,CATDSN=(dsn1,...dsnn)               ,STORGRP=storagegroup \*  
                         ALLDSN

## VSAM DATA SETS ONLY

,CASPLITR=nnn	,NEWRECSDATA=
,CISPLITR=nnn	,NEWRECSINDEX=
,FREESPACE=nnn	,NEWSTORCLASS=
,NCASPLITS=nnn	,NEWTRKSDATA=
,NCISPLITS=nnn	,NEWTRKSINDEX=
,NEWALL	,NEWVOLSDATA=
,NEWCYLSDATA=	,NEWVOLSINDEX=
,NEWCYLSINDEX=	,NOREVERT=
,NEWDATACLASS=	,NOUPDATES=ccc
,NEWFREESPACE=	,VSAMDEFINE=cccccc
,NEWMGMTCLASS=	,VSAMGROW=nnn

## ALL DATA SETS

,ALWAYSBACKUP  
,CRDAYS=nnn  
,CRDATE=YYDDD|YYYYDDD  
,CYLS=nnnn  
,DSNRETRY=cccccc  
,DSTYPE=(cccc,...cccc)  
,IFALL  
,IFANY  
,LRDAYS=nnnn  
,LRDATE=YYDDD|YYYYDDD  
,NOREORG  
,TRKS=nnnnnn

## IAM DATA SETS ONLY

,IAMDEFINE=ccc	,NEWVOLSINDEX=
,IAMGROW=nn	,NOREVERT=
,NEWALL	,NOUPDATES=ccc
,NEWCYLSDATA=	,OFULL=nn
,NEWCYLSINDEX=	,ORECS=nnnnnn
,NEWDATACLASS=	,OVERFLOWINDEX=nnnnnnnnnn
,NEWFREESPACE=	,PCTOFKEEPMULTIPLE=nnn
,NEWMGMTCLASS=	,PCTOFKEEPSINGLE=nnn
,NEWRECSDATA=	,PCTPEKEEPMULTIPLE=nnn
,NEWRECSINDEX=	,PCTPEKEEPSINGLE=nnn
,NEWSTORCLASS=	,PCTTRECO=nnn
,NEWTRKSDATA=	,PEFULL=nn
,NEWTRKSINDEX=	,PEBLKS=nnnnnn
,NEWVOLSDATA=	,PEUDATAR=nnnnnn

## BACKUP DATA SETS ONLY

,BACKUP=cccc  
,BACKUPDATACLASS=cccccccc  
,BACKUPEXPDT=nnnnnn  
,BACKUPGROUP=cccccc  
,BACKUPINDEX=cccccc  
,BACKUPMGMTCLASS=cccccccc  
,BACKUPRETPD=nnn  
,BACKUPSTORCLASS=cccccccc  
,BACKUPSTRING=(old,new)  
,GDGEMPTY  
,GDGLIMIT=nnn  
,GDGNOSCRATCH  
,MAXPRIBLKS=nnnn  
,PRISPACEPCT=nnn,  
,SECSPACEPCT=nnn

## PDS's ONLY

,PDSFULL=nn	,%DIRFREE=
,PDSEXTENTS=nn	,DIRBLKS=nn

\* VOL= or STORGRP= optional with CATDSN but required with ALLDSN or DSN

CONTINUED . . .

## 25.04 CONTINUED . . .

**SELECT COMMAND** This command defines the selection criteria to be used for REORG or SIMULATE processing. It is possible to override operands specified on the REORG command for the backup data sets created for the data sets selected by a particular SELECT command.

**OPERANDS** The following operands may be specified with SELECT to control REORG or SIMULATE processing.

**ALLDSN** Specifies that all data sets are to be processed regardless of data set name. This option is required if DSN= or CATDSN= is not specified and the intent is truly to process all data sets. You can specify CATDSN=\* \* or DSN=\* \* instead of using ALLDSN.

**ALWAYSBACKUP  
ALWAYS** Specifies that a backup should always be taken of data sets that meet the general selection criteria but do not qualify for reorganization.

When using this keyword, data sets will qualify for a backup when ALL CRITERIA EXCEPT THOSE LISTED BELOW are met:

<u>IAM-Enhanced</u>	<u>IAM-Compatible</u>	<u>VSAM</u>
OVERFLOWINDEX	OFULL	CASPLITR
PCTTRECO	OVERFLOWINDEX	CISPLITR
PEUDATAR	PCTTRECO	FREESPACE
	PEFULL	
	PEUDATAR	

If ALWAYSBACKUP is specified on the REORG command, it will automatically be in effect for all SELECT statements.

**BACKUP=** Overrides the value specified or defaulted on the REORG command for the disposition of backup data sets after a successful reorganization.

**TEMP** – Backup data sets on DASD will be deleted and uncataloged. Backup data sets on TAPE will be uncataloged. If the LASTAPE option was specified on the REORG command, BACKUP=PERM will be forced.

**PERM** – Backup data sets on DASD will not be deleted and uncataloged. Backup data sets on TAPE will not be uncataloged.

**GDG** – Same as PERM except backup data sets will be a +1 generation data set. REORG will dynamically define any generation data groups that do not already exist. The high level qualifier of the dynamically generated generation data groups must be aliased to an ICF catalog.

GDG's are not supported for parallel backups.

**BACKUPDATACLASS=  
BACKUPD** Defines a valid SMS data class which will be used instead of the data class specified on the REORG command to allocate SMS managed backup data sets. This operand will be ignored if BACKUPUNIT was specified on the REORG command.

**BACKUPEXPDT=  
BACKUPE** Defines the expiration date to be used for the backup data sets created for data sets selected by this SELECT statement. This operand can not be specified with BACKUPRETPD. Specify a julian date of the form YYDDD or YYYYDDD.

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## 25.04 CONTINUED . . .

**BACKUPGROUP=** Defines the group name to be used to generate the names of the backup data sets. The number of characters specified will replace, left to right, characters in the target data set name. You can specify a special identifier of &RACFUID or &RACFGID to indicate that the RACF user id or RACF group id be used.

**BACKUPG**

EXAMPLE:

```
SELECT DSN=(CI CS. **), BACKUPGROUP=BKUP
```

All backup data sets will have a data set name starting with BKUP.

```
SELECT DSN=(CI CS. **), BACKUPGROUP=&RACFUID
```

If the user id associated with this job is BKUP, all backup data sets will have a data set name starting with BKUP.

If MODE=PARALLEL, you must place a single question mark somewhere in the specified string. The question mark is replaced by a letter starting with A to identify the multiple backups taken in parallel mode.

EXAMPLE:

```
BACKUPGROUP=BKUP?
```

The generated backup dataset name will be the name of the selected dataset with BKUPA overlaying the first 5 characters of the first backup name, BKUPB will overlay the first 5 characters of the second backup name, and so on.

**BACKUPINDEX=**  
**BACKUPI**

Defines the pattern to be used to add or delete index levels when generating the backup data set name. REORG will use each index level specified in BACKUPINDEX in place of the original index level. If a period is specified without any characters following, the original index level will be copied to the backup data set name. If + is specified, the character following the + will be inserted into the backup data set name as a new index level. If ++ is specified, the characters following the ++ will be added to the end of the backup data set name as a new index level. If – is specified, the index level will be dropped from the backup data set name. You can specify a special identifier of &RACFUID or &RACFGID to indicate that the RACF user id or RACF group id be used.

EXAMPLES:

```
SELECT DSN=(CI CS. **), BACKUPI NDEX=++BACKUP
```

All backup data sets names will be generated using the target data set name with an additional index level of .BACKUP added to the end of the data set name.

```
SELECT DSN=(CI CS. **), BACKUPI NDEX=CI CSBKUP.
```

All backup data sets names will be generated using the target data set name with the high level index of CICS replaced with CICSBKUP.

```
SELECT DSN=(CI CS. **), BACKUPI NDEX=CI CSBKUP. ++BACKUP
```

All backup data sets names will be generated using the target data set name with the high level index of CICS replaced with CICSBKUP and .BACKUP added as an additional index level at the end of the data set name.

The default is ++BACKUP or the value specified on the REORG command.

```
SELECT DSN=(CI CS. **), BACKUPI NDEX=&RACFUID. ++BACKUP
```

If the user id associated with this job is CICSBKUP, all backup data sets names will be generated using the target data set name with the high level index of CICS replaced with CICSBKUP and .BACKUP added as an additional index level at the end of the data set name.

The default is ++BACKUP or the value specified on the REORG command.

If MODE=PARALLEL, you must place a single question mark somewhere in the specified string. The question mark is replaced by a letter starting with A to identify the multiple backups taken in parallel mode.

EXAMPLE:

```
BACKUPI NDEX=++BACKUP?
```

The generated backup dataset name will be the name of the selected dataset with .BACKUPA appended to the name of the first backup, .BACKUPB will be appended to the name of second backup, and so on.

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## 25.04 CONTINUED . . .

**BACKUPMGMTCLASS=** Defines a valid SMS management class which will be used instead of the management class specified on the REORG command to allocate SMS managed backup data sets. This operand will be ignored if BACKUPUNIT was specified on the REORG command.

**BACKUPRETPD=** Defines the retention period to be used for the backup data sets created for data sets selected by this SELECT statement. This operand can not be specified with BACKUPEXPDT.

**BACKUPSTORCLASS=** Defines a valid SMS storage class which will be used instead of the storage class specified on REORG command to allocate SMS managed backup data sets. This operand will be ignored if BACKUPUNIT was specified on the REORG command.

**BACKUPSTRING=** Specifies an old string and a new string enclosed in parentheses to be used in generating the name of a backup data set. Only the first occurrence of the old string will be replaced by the new string. If the old string is not found, a valid backup data set name can not be generated and the selected data set will be bypassed. To ensure that this does not occur, always include the old string in the names specified via the DSN or CATDSN keywords.

## EXAMPLE:

```
SELECT  DSN=(CI CS. VSAMCLUS. **),
        BACKUPSTRING=(VSAMCLUS, BKUPCLUS)
```

The string 'VSAMCLUS' will be replaced by the string 'BKUPCLUS' in the name of all backup data sets.

If MODE=PARALLEL, you must place a single question mark somewhere in the specified string. The question mark is replaced by a letter starting with A to identify the multiple backups taken in parallel mode.

## EXAMPLE:

```
BACKUPSTRING=(CLUSTER, BACKUP?)
```

The generated backup dataset name will be the name of the selected dataset with BACKUPA replacing CLUSTER in the name of the first backup, BACKKUPB will replace CLUSTER in the name of second backup, and so on.

**CASPLITR=** Defines the ratio of Control Area splits to every 100 Control Area's in a VSAM KSDS.

**CA**

This operand supports the following logical operators. =,≠,>,>=,<,<=

The default is >= the value in the FDRREORG option table which is shipped set to 10.

**CATDSN=** Specifies a list of up to 50 data set names or 50 data set filters. This operand can not be specified if DSN is specified. When this operand is used, the system catalog(s) are searched for all data sets that match the specified data set names or filters and reside on the volumes provided in VOL= operand (if specified). The volume processor subtasks will only process the volumes for the selected data sets. To get a list of all data set names returned from the catalog search, use PCATDSN instead of CATDSN. Refer to [section 52.16](#) for information on specifying a data set filter.

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## 25.04 CONTINUED . . .

<b>CISPLTR= CI</b>	<p>Defines the ratio of Control Interval splits to every 100 Control Interval's in a VSAM KSDS.</p> <p>This operand supports the following logical operators. =,=F,&gt;,&gt;=,&lt;,&lt;=</p> <p>The default is &gt;= the value in the FDRREORG option table which is shipped set to 10.</p>
<b>CRDAYS=</b>	<p>Defines the number of days since a file was created.</p> <p>This operand supports the following logical operators. =,=F,&gt;,&gt;=,&lt;,&lt;=</p>
<b>CRDATE=</b>	<p>Defines the day a file was created. Specify a julian date of the form YYDDD or YYYYDDD.</p> <p>This operand supports the following logical operators. =,=F,&gt;,&gt;=,&lt;,&lt;=</p>
<b>CYLS=</b>	<p>Defines the size of a data set in Cylinders. Allocated or used space will be used as requested by the DATA= operand of the REORG or SIMULATE command.</p> <p>This operand supports the following logical operators. =,=F,&gt;,&gt;=,&lt;,&lt;=</p>
<b>%DIRFREE=</b>	<p>Specifies the percentage of free PDS directory blocks required. The PDS directory will be expanded to this value if required.</p>
<b>DIRBLKS=</b>	<p>Specifies the number of PDS directory blocks to be added.</p>
<b>DSN=</b>	<p>Specifies a list of up to 50 data set names or 50 data set filters. This operand can not be specified if CATDSN is specified. Data set selection is not done until the volumes provided in the VOL= operand are processed. Refer to <a href="#">Section 52.16</a> for information on specifying a data set filter.</p>
<b>DSTYPE= DST</b>	<p>Specifies the type(s) of data sets to be considered for reorganization.</p> <p><b>IAM</b> – IAM data sets are eligible for reorganization.</p> <p><b>VSAM</b> – VSAM data sets are eligible for reorganization.</p> <p><b>PDS</b> – Partitioned data sets are eligible for reorganization (compression).</p> <p><b>ALL</b> – All data sets are eligible for reorganization.</p> <p>PDS is ignored if MODE=PARALLEL.</p> <p>ALL is the default value unless specified on the REORG or SIMULATE command.</p>
<b>DSNRETRY= DSNR</b>	<p>Defines the action to take for data sets that are not available when they are selected for processing.</p> <p><b>NO</b> – The data set is bypassed.</p> <p><b>RETRY</b> – The data set will be added to the task's retry queue and periodic attempts will be made to allocate the data set. If the data set does not become available before the task completes its processing, the data set is bypassed.</p> <p><b>ENQ</b> – The data set will be added to the task's retry queue and an ENQ for the data set will be left pending. If the ENQ is not satisfied before the task completes its processing, the data set is bypassed.</p> <p><b>WAIT</b> – The data set will be added to the task's retry queue and an ENQ for the data set will be left pending. The task will wait for all data sets queue'd with the wait option before terminating. An operator STOP (P) command can be used to shutdown FDRREORG normally if it is no longer desirable to wait for data sets.</p> <p>The default is NO or the value specified on the REORG command.</p>

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## 25.04 CONTINUED . . .

**FREESPACE=** Defines the VSAM CA or CI free space percent. This keyword is used to prevent  
**FREESP** reorganizations of VSAM KSDS's or AIX's that have very high free space percentages. To reduce splits for some files in online systems, some VSAM files are loaded with little or no free space and then altered to have a very high CA and/or CI freespace percent. If these files are processed by FDRREORG, the current freespace percentage is used resulting in a dramatic increase in space.

This operand supports the following logical operators. =, -F, >, >=, <, <=

The default is < the value in the FDRREORG option table which is shipped set to 50.

**GDGEMPTY** Specifies that dynamically defined GDG's will be defined with the EMPTY  
**GDGEMP** attribute. Without this option, all dynamically defined GDG's are defined with the NOEMPTY attribute.

**GDGLIMIT=** Defines the maximum number of generation data sets that can be cataloged for  
**GDGLIM** a dynamically defined GDG.

The default is 5.

**GDGNOSCRATCH** Specifies that dynamically defined GDG's will be defined with the  
**GDGNOSCR** NOSCRATCH attribute. Without this option, all dynamically defined GDG's are defined with the SCRATCH attribute.

**IAMDEFINE=** Specifies if FDRREORG should delete and define IAM datasets that will be  
**IAMDEF** reorganized.

**YES** – IAM datasets will be deleted and defined before reloading.

**NO** – IAM datasets will not be deleted and defined before reloading.

The default is the value specified on the REORG or SIMULATE card.

Note – This feature requires IAM 6.3 or above. Additionally, files defined with an earlier release of IAM will not be redefined by FDRREORG until they are first redefined with IAM 6.3 or above.

**IAMGROW=** Specifies the percent to increase the size of single volume IAM datasets that  
 are redefined.

**IFALL** Specifies that all of the criteria that measure the level of disorganization within a data set need to be satisfied in order to select a data set. This keyword applies to the following keywords only:

IAM-Enhanced	IAM-Compatible	VSAM	PDS
OVERFLOWINDEX	OFULL	CASPLITR	PDSFULL
PCTTRECO	OVERFLOWINDEX	CISPLITR	PDSEXTENTS
PEUDATAR	PCTTRECO		
	PEFULL		
	PEUDATAR		

IFANY is the default.

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## 25.04 CONTINUED . . .

<b>IFANY</b>	Specifies that any of the criteria that measure the level of disorganization within a data set need to be satisfied in order to select a data set. This keyword applies to the following keywords only:																								
	<table><tr><td><u>IAM-Enhanced</u></td><td><u>IAM-Compatible</u></td><td><u>VSAM</u></td><td><u>PDS</u></td></tr><tr><td>OVERFLOWINDEX</td><td>OFULL</td><td>CASPLITR</td><td>PDSFULL</td></tr><tr><td>PCTTRECO</td><td>OVERFLOWINDEX</td><td>CISPLITR</td><td>PDSEXTENTS</td></tr><tr><td>PEUDATAR</td><td>PCTTRECO</td><td></td><td></td></tr><tr><td></td><td>PEFULL</td><td></td><td></td></tr><tr><td></td><td>PEUDATAR</td><td></td><td></td></tr></table>	<u>IAM-Enhanced</u>	<u>IAM-Compatible</u>	<u>VSAM</u>	<u>PDS</u>	OVERFLOWINDEX	OFULL	CASPLITR	PDSFULL	PCTTRECO	OVERFLOWINDEX	CISPLITR	PDSEXTENTS	PEUDATAR	PCTTRECO				PEFULL				PEUDATAR		
<u>IAM-Enhanced</u>	<u>IAM-Compatible</u>	<u>VSAM</u>	<u>PDS</u>																						
OVERFLOWINDEX	OFULL	CASPLITR	PDSFULL																						
PCTTRECO	OVERFLOWINDEX	CISPLITR	PDSEXTENTS																						
PEUDATAR	PCTTRECO																								
	PEFULL																								
	PEUDATAR																								
	IFANY is the default.																								
<b>LRDAYS=</b>	Defines the number of days since a data set was last referenced.  This operand supports the following logical operators. =,≠,>,≥,<,<=																								
<b>LRDATE=</b>	Defines the date that the data set was last referenced. Specify a julian date of the form YYDDD or YYYYDDD.  This operand supports the following logical operators. =,≠,>,≥,<,<=																								
<b>MAXPRIBLKS=</b> <b>MAXP=</b>	Specifies the maximum number of blocks that FDRREORG will use for the primary space allocation when allocating backup datasets on DASD. If the estimated total blocks calculated by FDRREORG exceeds this value, FDRREORG will increase the unit count by 1 for each increment of this value.  If the volumes used for backup datasets are extremely fragmented, reducing this value should reduce the number of space related dynamic allocation failures. Keep in mind that additional units may be required to satisfy the allocation request which may not be available.  If very large datasets are reorganized and there are a limited number of volumes in the pool used for backup dataset allocations, increasing this value should reduce the number of unit related dynamic allocation failures. Keep in mind that requesting a larger primary allocation could cause allocations to fail because of insufficient space.  The default is 50000 blocks.																								
<b>NCASPLITS=</b> <b>NCA</b>	Defines the number of Control Area splits.  This operand supports the following logical operators. =,≠,>,≥,<,<=																								
<b>NCISPLITS=</b> <b>NCI</b>	Defines the number of Control Interval splits.  This operand supports the following logical operators. =,≠,>,≥,<,<=																								
<b>NEWALL</b>	This keyword is required to redefine multiple VSAM KSDS's with new space, volumes, or freespace via a single select statement that specifies multiple data set names or uses a data set mask. Without this keyword, FDRREORG will treat the combination of new space, volumes, or freespace as a keyword error to prevent accidentally redefining many VSAM KSDS's with the same space, volumes or freespace.																								

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## 25.04 CONTINUED . . .

**NEWCYLSDATA=** Specifies a new primary and optional secondary space in cylinders to be used  
**NEWCYLSD** for the data component of a VSAM KSDS or an IAM file, if it is redefined.

## EXAMPLES:

NEWCYLSDATA=( 100, 10)

The redefined data component or IAM file will have 100 cylinders of primary space and 10 cylinders of secondary space.

NEWCYLSDATA=100

The redefined data component or IAM file will have 100 cylinders of primary space and no secondary space.

**NEWCYLSINDEX=** Specifies a new primary and optional secondary space in cylinders to be used  
**NEWCYLSI** for the index component of a VSAM KSDS if it is redefined.

## EXAMPLES:

NEWCYLSI NDEX=( 2, 1)

The redefined index component will have 2 cylinders of primary space and 1 cylinder of secondary space.

NEWCYLSI NDEX=2

The redefined index component will have 2 cylinders of primary space and no secondary space.

**NEWDATACLASS=** Specifies the name of a valid SMS data class to be used to redefine a VSAM cluster and its alternate indexes if any, or an IAM file.

NOTE: The installation SMS ACS routine can override this class name.

**NEWFREESPACE=** Specifies a new CI and CA freespace percentage to be used for the data  
**NEWFREESP** component of a VSAM KSDS or an IAM file, if it is redefined.

## EXAMPLES:

NEWFREESPACE=( 10, 20)

The redefined data component or IAM file will have 10 percent CI freespace and 20 percent CA freespace.

**NEWMGMTCLASS=** Specifies the name of a valid SMS management class to be used to redefine a VSAM cluster and its alternate indexes if any, or an IAM file.

NOTE: The installation SMS ACS routines can override this class name.

**NEWRECSDATA=** Specifies a new primary and optional secondary space in records to be used  
**NEWRECS** for the data component of a VSAM KSDS or an IAM file, if it is redefined.

## EXAMPLES:

NEWRECSDATA=( 10000, 1000)

The redefined data component or IAM file will have 10000 records of primary space and 1000 records of secondary space.

NEWRECSDATA=10000

The redefined data component or IAM file will have 10000 records of primary space and no secondary space.

NOTE: VSAM will convert the number of records specified into an appropriate number of cylinders or tracks.

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## 25.04 CONTINUED . . .

**NEWRECSINDEX=  
NEWRECSI**

Specifies a new primary and optional secondary space in records to be used for the index component of a VSAM KSDS if it is redefined.

**EXAMPLES:**

NEWRECSI NDEX=( 500, 50)

The redefined index component will have 500 records of primary space and 50 records of secondary space.

NEWCYLSI NDEX=500

The redefined index component will have 500 records of primary space and no secondary space.

NOTE: VSAM will convert the number of records specified into an appropriate number of cylinders or tracks.

**NEWSTORCLASS=**

Specifies the name of a valid SMS storage class to be used to redefine a VSAM cluster and its alternate indexes if any, or an IAM file.

NOTE: The installation SMS ACS routines can override this class name.

**NEWTRKSDATA=  
NEWTRKSD**

Specifies a new primary and optional secondary space in tracks to be used for the data component of a VSAM KSDS or an IAM file if it is redefined.

**EXAMPLES:**

NEWTRKSDATA=( 100, 10)

The redefined data component or IAM file will have 100 tracks of primary space and 10 tracks of secondary space.

NEWTRKSDATA=100

The redefined data component or IAM file will have 100 tracks of primary space and no secondary space.

**NEWTRKSINDEX=  
NEWTRKSI**

Specifies a new primary and optional secondary space in tracks to be used for the index component of a VSAM KSDS if it is redefined.

**EXAMPLES:**

NEWTRKSI NDEX=( 2, 1)

The redefined index component will have 2 tracks of primary space and 1 track of secondary space.

NEWTRKSI NDEX=2

The redefined index component will have 2 tracks of primary space and no secondary space.

**NEWVOLSDATA=  
NEWVOLSD**

Specifies up to 20 volumes to be used for the data component of a VSAM KSDS or an IAM file, if it is redefined. If the dataset is SMS managed, SMS=SMS will be forced for the define. SMS may or may not use the volumes specified.

**EXAMPLES:**

NEWVOLSDATA=( MYVOL1, MYVOL2)

**NEWVOLSIINDEX=  
NEWVOLSI**

Specifies up to 10 volumes to be used for the index component of a VSAM KSDS if it is redefined. If the dataset is SMS managed, SMS=SMS will be forced for the define. SMS may or may not use the volumes specified.

**EXAMPLES:**

NEWVOLSI NDEX=( MYVOL1, MYVOL2)

**NOREVERT**

Specifies that FDRREORG should not revert to the original define parameters if a redefine fails. Without this keyword, FDRREORG will always redefine with the original space, volumes, and freespace parameters, if the define fails and any of these parameters were changed via the appropriate NEWxxxx keyword(s).

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## 25.04 CONTINUED . . .

<b>NOREORG</b>	Specifies that selected data sets should be backed up but not reorganized.  If NOREORG is specified on the REORG command, it will automatically be in effect for all SELECT statements.
<b>NOUPDATES= NOUP</b>	Specifies the action to take for IAM or VSAM data sets selected for reorganization that have had no adds, no deletes and no updates.  <b>YES</b> – The data set will be reorganized. <b>NO</b> – The data set will not be reorganized.  The default is the value specified on the REORG or SIMULATE command.
<b>OFULL= OF</b>	Defines the percent of overflow area used in an IAM file in compatible format.  This operand supports the following logical operators. =,=F,>,>=,<,<=  The default is >= the value in the FDRREORG option table which is shipped set to 80.
<b>ORECS= OR</b>	Defines the number of records that have been allocated for the IAM overflow area for a file in compatible format.  This operand supports the following logical operators. =,=F,>,>=,<,<=
<b>OVERFLOWINDEX=</b>	Specifies the amount of memory in bytes required for the in storage IAM overflow index.  This operand supports the following logical operators. =,=F,>,>=,<,<=  The default is >= the value in the FDRREORG option table which is shipped set to 1048576 (1 megabyte).
<b>PCTOFKEEPMULTIPLE= PCTOFKEEPM</b>	Specifies the percentage of IAM independent overflow to be retained for files in compatible format that were not loaded via a single record load.  The default is 100.
<b>PCTOFKEEPSINGLE= PCTOFKEEPS</b>	Specifies the percentage of IAM independent overflow to be retained for files in compatible format that were loaded via a single record load.  The default is 100.
<b>PCTPEKEEPMULTIPLE= PCTPEKEEPM</b>	Specifies the percentage of IAM prime extension blocks to be retained for files in compatible format that were not loaded via a single record load.  The default is 100.
<b>PCTPEKEEPSINGLE= PCTPEKEEPS</b>	Specifies the percentage of IAM prime extension blocks to be retained for files in compatible format that were loaded via a single record load.  The default is 100.
<b>PCTTRECO=</b>	Defines the percent of total records in an IAM file that are in the IAM overflow area.  This operand supports the following logical operators. =,=F,>,>=,<,<=  The default is >= the value in the FDRREORG option table which is shipped set to 10.
<b>PDSFULL= PDSF</b>	Defines the percent of allocated space used by a PDS.  This operand supports the following logical operators. =,=F,>,>=,<,<=  The default is >= the value in the FDRREORG option table which is shipped set to 90.

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## 25.04 CONTINUED . . .

<b>PDSEXTENTS=</b> <b>PDSEX</b>	<p>Defines the number of extents for a PDS. This operand supports the following logical operators. =,=F,&gt;,&gt;=,&lt;,&lt;=</p> <p>The default is &gt;= the value in the FDRREORG option table which is shipped set to 17.</p>
<b>PEBLKS=</b> <b>PEB</b>	<p>Defines the number of blocks that have been allocated for the IAM prime extension for a file in compatible format.</p> <p>This operand supports the following logical operators. =,=F,&gt;,&gt;=,&lt;,&lt;=</p>
<b>PEFULL=</b> <b>PEF</b>	<p>Defines the percent of the prime extension area used in a IAM file in compatible format.</p> <p>This operand supports the following logical operators. =,=F,&gt;,&gt;=,&lt;,&lt;=</p> <p>The default is &gt;= the value in the FDRREORG option table which is shipped set to 100.</p>
<b>PEUDATAR=</b> <b>PEUD</b>	<p>Defines the ratio times 100 of used prime extension blocks to prime data blocks in an IAM file.</p> <p>This operand supports the following logical operators. =,=F,&gt;,&gt;=,&lt;,&lt;=</p> <p>The default is &gt;= the value in the FDRREORG option table which is shipped set to 100.</p>
<b>PRISPACEPCT=</b> <b>PRISP</b>	<p>Defines the percentage to be used to calculate the primary space allocation for a backup data set that will be on DASD. This percentage is applied to total used space for the target data set.</p> <p>The default is 60.</p>
<b>SECSPACEPCT=</b> <b>SECSP</b>	<p>Defines the percentage to be used to calculate the secondary space allocation for a backup data set that will be on DASD. This percentage is applied to the primary space allocation used for the backup data set.</p> <p>The default is 25.</p>
<b>STORGRP=</b>	STORGRP= can be used only on systems active with SMS; it will select all volumes in the specified SMS storage group.
<b>TRKS=</b>	<p>Defines the size of a data set in tracks. Allocated or used space will be used as specified by the DATA= operand of REORG or SIMULATE.</p> <p>This operand supports the following logical operators. =,=F,&gt;,&gt;=,&lt;,&lt;=</p>
<b>VOL=</b>	<p>Specifies a list of up to 50 volumes or volume groups. A volume group is specified by coding an asterisk at the end of the volser prefix (i.e. VOL=PROD*). Use VOL=* to specify all volumes.</p>
<b>VSAMDEFINE=</b> <b>VSAMDEF</b>	<p>Specifies when FDRREORG should delete and define VSAM KSDS's that will be reorganized.</p> <p><b>ALWAYS</b> – VSAM KSDS's are always deleted and defined before reloading.</p> <p><b>IFREQ</b> – Only VSAM KSDS's that cannot be reused will be deleted and defined before reloading.</p> <p><b>NO</b> – Disables delete and define of all VSAM KSDS's. KSDS's that cannot be reused will not be reorganized.</p> <p>The default is the value specified on the REORG or SIMULATE card.</p>
<b>VSAMGROW=</b>	Specifies the percent to increase the size of VSAM single volume KSDS's that are redefined.

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## 25.05 FDRREORG – KEYWORDS AND OPTIONS – The RECOVER COMMAND

<b>RECOVER REC</b>	<b>BUILDEMTYAIX=ccc</b>	<b>,NEWFREESPACE=nnn</b>
	<b>CKPTPREFIX=c.....c</b>	<b>,NEWMGMTCLASS=cccccccc</b>
	<b>,CONVERTINDEX</b>	<b>,NEWRECSDATA=nnn</b>
	<b>,DSN=(dsn1,...dsnn)</b>	<b>,NEWRECSINDEX=nnn</b>
	<b>,ENQERR=ccc</b>	<b>,NEWSTORCLASS=cccccccc</b>
	<b>,EXDSN=(dsn1,...dsnn)</b>	<b>,NEWTRKSDATA=nnn</b>
	<b>,IAMDISP=ccc</b>	<b>,NEWTRKSINDEX=nnn</b>
	<b>,JOBNAME=c.....c</b>	<b>,NEWVOLSDATA=(cccccc, . . . )</b>
	<b>,LOGPREFIX=c.....c</b>	<b>,NEWVOLSINDEX=(cccccc, . . . )</b>
	<b>,MAXENVERR=nnn</b>	<b>,NOCKPT</b>
	<b>,MAXSYSERR=nnn</b>	<b>,NOLOG</b>
	<b>,MAXTASKS=nn</b>	<b>,NONSMS=cccc</b>
	<b>,MOVEAIX=ccc</b>	<b>,SELTERR=ccc</b>
	<b>,MSGLEVEL=c</b>	<b>,SMS=cccc</b>
	<b>,MSGTIMESTAMP=ccc</b>	<b>,SMSADDVOL</b>
	<b>,NEWCYLSDATA=nnn</b>	<b>,SORTRPT=ccc</b>
	<b>,NEWCYLSINDEX=nnn</b>	<b>,VSAMDISP=ccc</b>
	<b>,NEWDATACLASS=cccccccc</b>	

**RECOVER** This command is used to complete reorg processing for data sets that were not completely re-loaded from a prior run. If you use the JOBNAME keyword, FDRREORG will automatically allocate the appropriate checkpoint and log file data sets. Otherwise, the checkpoint and log files must be provided via DD statements. The checkpoint file is used to recover data sets that were being reorganized when FDRREORG abnormally terminated. Any data sets that were being re-loaded at this time are recovered. Data sets that had not completed the backup phase are bypassed. The log file is used to recover individual data sets that did not complete re-load processing. These data sets usually require some form of manual intervention before recovery will be successful. The most common cause will probably be insufficient space. This occurs because the data sets most likely selected for reorg processing may exhaust the allocated space if a significant number of records have been inserted into the files freespace area's. When the data set is reloaded, these records will be moved out of the files freespace areas which results in the increased space requirements.

Note – [see Section 25.10](#) for the FDRREORG Recover Examples.

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## 25.05 CONTINUED . . .

**OPERANDS** The following operands may be specified with RECOVER to control recovery processing.

- BUILDEMPTYAIX=** Specifies if FDRREORG should perform a build index on the empty alternate indexes of base clusters selected for reorganization. The default is NO.
- YES** – Build empty alternate indexes.  
**NO** – Do not build empty alternate indexes.
- CKPTPREFIX=**  
**CKPTP** Specifies the high level qualifier used when the checkpoint file was allocated. You can specify a special identifier of &RACFUID or &RACFGID to indicate that the RACF user id or RACF group id be used.
- The default is taken from the FDRREORG option table which is shipped set to FDRREORG.
- CONVERTINDEX** Directs FDRREORG to convert an imbedded index of a VSAM KSDS or AIX to noimbed if it is redefined with a dataclass that requires extended format. VSAM compaction or extended addressability require extended format. Without this keyword, FDRREORG will issue message FDRS63 and redefine the KSDS or AIX using the original define parameters.
- DSN=** Specifies a list of up to 50 data set names or 50 data set filters to recover. If this keyword is not provided, all data sets that qualify for recovery will be processed. This keyword can not be specified with EXDSN. Refer to [Section 52.16](#) for information specifying a data set filter.
- The default is DSN=\* \*
- ENQERR=** Specifies if FDRREORG should set return code 8 if a data set selected for recovery is in use by another job or user.
- YES** – Set return code 8 if a data set is in use.  
**NO** – Do not set return code 8 if a data set is in use.
- EXDSN=** Specifies a list of up to 50 data set names or 50 data set filters to exclude from recovery processing. This keyword can not be specified with DSN. Refer to [Section 52.16](#) for information specifying a data set filter.
- IAMDISP=** Specifies the disposition REORG is to use when allocating IAM data sets to be recovered.
- OLD** – IAM data sets will be allocated DISP=OLD.  
**SHR** – IAM data sets will be allocated DISP=SHR.
- The default and recommended value is OLD !
- JOBNAME=**  
**JOB** Specifies the name of the failed job to recover. FDRREORG will automatically allocate the checkpoint and log files from the specified job and recover all data sets that qualify for recovery. If this keyword is not specified, you MUST provide either a REORGCKP and/or REORGLOG DD statement to define the checkpoint and log files.
- Please note that depending on the type of failure that occurred, both of these files may not exist. The checkpoint file will only exist if FDRREORG was abnormally terminated, or if a volume processor subtask abended and was unable to log the name of the active data set to the log file. The log file will only exist if there were unsuccessful reloads. FDRREORG handles this automatically if you use the JOBNAME keyword. If you provide the DD statements via JCL, you must provide the appropriate NOCKPT or NOLOG keywords.

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## 25.05 CONTINUED . . .

<b>LOGPREFIX= LOGP</b>	<p>Specifies the high level qualifier used when the log file was allocated. You can specify a special identifier of &amp;RACFUID or &amp;RACFGID to indicate that the RACF user id or RACF group id be used.</p> <p>The default is taken from the FDRREORG option table which is shipped set to FDRREORG.</p>
<b>MAXENVERR= MAXENV</b>	<p>Specifies the maximum number of environmental errors allowed. When this limit is reached, all subtasks will terminate after processing the currently active data set.</p> <p>The default is 99.</p>
<b>MAXSYSERR= MAXS</b>	<p>Specifies the maximum number of system abends allowed. When this limit is reached, all subtasks will terminate after processing the currently active data set.</p> <p>The default is taken from the FDRREORG option table which is shipped set to 99.</p>
<b>MAXTASKS= MAXT</b>	<p>Specifies the maximum number of concurrent data sets to be recovered. You may specify any number from 1 to 15, inclusive. If the backup files created by the failed REORG are on tape, there may be contention for the tape volumes if there were multiple failures from the same task.</p> <p>The default is taken from the FDRREORG option table which is shipped set to 4.</p>
<b>MOVEAIX=</b>	<p>Specifies if the alternate index data set(s) should be moved if the base cluster is moved.</p> <p><b>YES</b> – The alternate index data set(s) are defined using the NEWVOLS specified for the base cluster.</p> <p><b>NO</b> – The alternate index data set(s) are defined on the original volumes.</p> <p>The default is NO. YES will be forced if a NONSMS managed cluster is redefined as an SMS managed cluster or if an SMS managed cluster is redefined a NONSMS managed cluster.</p>
<b>MSGTIMESTAMP= MSGT</b>	<p>Specifies whether messages written to REORGPRT will be suffixed with the current date, time, and the internal subtask id that issued the message. If YES is requested or defaulted, the LRECL of the REORGPRT file is increased to 151.</p> <p><b>YES</b> – Messages will be timestamped.</p> <p><b>NO</b> – Messages will not be timestamped.</p> <p>The default is taken from the FDRREORG option table which is shipped set to YES.</p>
<b>NEWCYLSDATA= NEWCYLSD</b>	<p>Specifies a new primary and optional secondary space in cylinders to be used for the data component of a VSAM KSDS or an IAM file, if it is redefined.</p> <p>Examples: NEWCYLSDATA=( 100, 10) The redefined data component will have 100 cylinders of primary space and 10 cylinders of secondary space.</p> <p>NEWCYLSDATA=100 The redefined data component will have 100 cylinders of primary space and no secondary space.</p>
<b>NEWCYLSINDEX= NEWCYLSI</b>	<p>Specifies a new primary and optional secondary space in cylinders to be used for the index component of a VSAM KSDS if it is redefined.</p> <p>Examples: NEWCYLSI NDEX=( 2, 1) The redefined data component will have 2 cylinders of primary space and 1 cylinders of secondary space.</p> <p>NEWCYLSI NDEX=2 The redefined index component will have 2 cylinders of primary space and no secondary space.</p>
<b>NEWDATACLASS=</b>	<p>Specifies the name of a valid SMS data class to be used to redefine a VSAM cluster and its alternate indexes if any or an IAM file.</p> <p>Note – The installation SMS ACS routines can override this class name.</p>

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## 25.05 CONTINUED . . .

- NEWFREESPACE=** Specifies a new CI and CA freespace percentage to be used for the data component of a VSAM KSDS or an IAM file, if it is redefined.  
**NEWFREESP** Examples: NEWFREESPACE=( 10, 20)  
 The redefined data component or IAM file will have 10 percent CI freespace and 20 percent CA freespace.
- NEWMGMTCLASS=** Specifies the name of a valid SMS management class to be used to redefine a VSAM cluster and its alternate indexes if any or an IAM file.  
 Note – The installation SMS ACS routines can override this class name.
- NEWRECSDATA=** Specifies a new primary and optional secondary space in records to be used for the data component of a VSAM KSDS or an IAM file, if it is redefined.  
**NEWRECS** Examples: NEWRECSDATA=( 10000, 1000)  
 The redefined data component or IAM file will have 10000 records of primary space and 1000 records of secondary space.  
 NEWRECSDATA=10000  
 The redefined data component or IAM file will have 10000 records of primary space and no secondary space.  
 Note – VSAM will convert the number of records specified into an appropriate number of cylinders or tracks.
- NEWRECSIINDEX=** Specifies a new primary and optional secondary space in records to be used for the index component of a VSAM KSDS if it is redefined.  
**NEWRECSI** Examples: NEWRECSI INDEX=( 500, 50)  
 The redefined index component will have 500 records of primary space and 50 records of secondary space.  
 NEWCYLSI INDEX=500  
 The redefined index component will have 500 records of primary space and no secondary space.  
 Note – VSAM will convert the number of records specified into an appropriate number of cylinders or tracks.
- NEWSTORCLASS=** Specifies the name of a valid SMS storage class to be used to redefine a VSAM cluster and its alternate indexes if any or an IAM file.  
 Note – The installation SMS ACS routines can override this class name.
- NEWTRKSDATA=** Specifies a new primary and optional secondary space in tracks to be used for the data component of a VSAM KSDS or an IAM file, if it is redefined.  
**NEWTRKSD** Examples: NEWTRKSDATA=( 100, 10)  
 The redefined data component or IAM file will have 100 tracks of primary space and 10 tracks of secondary space.  
 NEWTRKSDATA=100  
 The redefined data component or IAM file will have 100 tracks of primary space and no secondary space.
- NEWTRKSIINDEX=** Specifies a new primary and optional secondary space in tracks to be used for the index component of a VSAM KSDS if it is redefined.  
**NEWTRKSI** Examples: NEWTRKSI INDEX=( 2, 1)  
 The redefined index component will have 2 tracks of primary space and 1 track of secondary space.  
 NEWTRKSI INDEX=2  
 The redefined index component will have 2 tracks of primary space and no secondary space.
- NEWVOLSDATA=** Specifies up to 20 volumes to be used for the data component of a VSAM KSDS or an IAM file, if it is redefined. If the dataset is SMS managed, SMS=SMS will be forced for the define. SMS may or may not use the volumes specified.  
**NEWVOLSD** Examples: NEWVOLSDATA=( MYVOL1, MYVOL2)

CONTINUED . . .



## 25.05 CONTINUED . . .

<b>NEWVOLINDEX= NEWVOLSI</b>	Specifies up to 10 volumes to be used for the index component of a VSAM KSDS if it is redefined. If the dataset is SMS managed, SMS=SMS will be forced for the define. SMS may or may not use the volumes specified. Examples: NEWVOLSI NDEX=(MYVOL1, MYVOL2)
<b>NOCKPT</b>	Specifies that the checkpoint file should be ignored. This keyword can not be specified with NOLOG. This keyword is required if the JOBNAME keyword is not used and there is no REORGCKP DD statement in the JCL.
<b>NOLOG</b>	Specifies that the log file should be ignored. This keyword can not be specified with NOCKPT. This keyword is required if the JOBNAME keyword is not used and there is no REORGLOG DD statement in the JCL.
<b>NONSMS=</b>	Specifies if FDRREORG's internal define should keep the current management status for NONSMS managed clusters or let the SMS ACS routines decide. <b>KEEP</b> – NONSMS managed clusters are redefined as NONSMS managed clusters. <b>SMS</b> – The installation SMS ACS routines will decide if the cluster should be defined as managed cluster.
<b>SELTERR=</b>	Specifies if FDRREORG should set a return code of 8 if no data sets are selected by RECOVER. <b>YES</b> – Set return code 8 if no data sets are selected <b>NO</b> – Do not set return code 8 if no data sets are selected. The default is taken from the FDRREORG option table which is shipped set to YES.
<b>SMS=</b>	Specifies if FDRREORG's internal define should keep the current management status and volumes for SMS managed datasets or let the SMS ACS routines decide. <b>KEEP</b> – SMS managed datasets are redefined as SMS managed datasets on the same volumes. If you are running DF/SMS 1.3 or above, only the first volume will be the same. <b>SMS</b> – The installation SMS ACS routines will decide if the dataset should be defined as a managed dataset. SMS will select the volumes used to define the dataset. Note – If the SMS ACS routines indicate that a currently SMS managed dataset should not be redefined as SMS managed, FDRREORG will force SMS=KEEP if NEWVOLSDATA and NEWVOLINDEX were not specified.
<b>SMSADDVOL</b>	Directs FDRREORG to dynamically add an SMS dummy candidate volume for SMS managed datasets before starting the reload. If more space is required during the reload than is available on the current volume(s), the candidate volume will be converted to a real volume and the reload should be able to complete without an out of space error. If the volume is not used, FDRREORG will remove it.  Note – This feature is not supported for IAM datasets defined with guaranteed space. <b>Warning – If this keyword was specified on the failed reorganization, another candidate volume will be added during recover processing. If neither candidate is used, only one will be removed.</b>
<b>SORTRPT=</b>	Specifies the sorting option for the report written to REORGRPT. Specifying YES requires that information related to each data set processed or selected to be kept in storage until the function is completed. Because this might require a significant amount of virtual storage, this option is only supported for MVS/XA or MVS/ESA systems. <b>YES</b> – Report is produced at the end of a REORG, SIMULATE or RECOVER function in data set name and volser order. <b>NO</b> – Report is produced as data sets are processed or selected. The default is taken from the FDRREORG option table which is shipped set to NO.
<b>VSAMDISP=</b>	Specifies the disposition REORG is to use when allocating VSAM data sets to be recovered. <b>OLD</b> – VSAM data sets will be allocated DISP=OLD. <b>SHR</b> – VSAM data sets will be allocated DISP=SHR. The default and recommended value is OLD !

**25.06 FDRREORG -- OPERATOR COMMANDS**

FDRREORG gives the console operator the capability to display the current status of FDRREORG and to stop REORG processing after all active data sets are processed.

**OPERATOR  
COMMANDS****P|STOP jobname**

FDRREORG will complete processing all active data sets and stop.

**F|MODIFY jobname,STATUS**

FDRREORG will display on the operators console the volume and data set being processed for each active subtask.

**25.07 FDRREORG SAMPLE JCL REQUIREMENTS AND CONTROL STATEMENT DEFAULTS**

To execute FDRREORG use the following JCL:

<b>JOB CONTROL REQUIREMENTS</b>	The JOB Statement is user specified and depends upon installation standards.
<b>EXEC STATEMENT</b>	Must specify a program name of FDRREORG. Region requirements vary by the type of data sets being processed and the number of subtasks invoked. Generally, simulation requires 3 megabytes of storage. REORG usually requires 4 to 9 megabytes of virtual storage below the line. FDRREORG utilizes storage above the line whenever possible.
<b>STEPLIB or JOBLIB DD STATEMENT</b>	If required, must specify the load module library in which FDRREORG resides. You may also need to specify the name of the IAM load module library if you have IAM installed and it is not in LNKLIST.
<b>SYSPRINT DD STATEMENT</b>	Specifies the output message data set. This is a required DD statement and usually is a SYSOUT data set. Messages from FDRREORG's main task are written to this DD.
<b>REORGPRT DD STATEMENT</b>	Specifies the output message data set. This is a required DD statement and usually is a SYSOUT data set. Messages from FDRREORG's subtasks are written to this DD.
<b>REORGRPT DD STATEMENT</b>	Specifies the report data set. This is a required DD statement and usually is a SYSOUT data set.
<b>SYSIN DD STATEMENT</b>	Specifies the control statement data set required for all functions. Usually an input stream or DD * dataset.

CONTINUED . . .

## 25.07 CONTINUED . . .

**DEFAULTS** FDRREORG is shipped with default values set in the FDRREORG option table for selected keywords if you do not provide your own. If you code a REORG command and do not provide the keywords or an alternative to the keywords shown below, the REORG command will be executed as if you provided the following control card:

```
REORG          BACKUP=TEMP, BACKUPI NDEX=++BACKUP,
                BACKUPALLOC=UNI T, BACKUPUNI T=SYSDA,
                CKPTPREFI X=FDRREORG, CKPTALLOC=UNI T, CKPTUNI T=SYSDA,
                LOGPREFI X=FDRREORG, LOGALLOC=UNI T, LOGUNI T=SYSDA,
                DATA=USED, DSNRETRY=NO,
                OWNERSTRI NG=$FDR, VSAMDEFI NE=I FREQ, BUI LDEMPYAI X=NO
```

For the SELECT statement, you must provide at least one and it must contain a data set or data set filter list specified by the CATDSN or DSN keywords, and a volume list specified by the VOL keyword if the DSN keyword was used to provide the data set or data set filter list. If you do not provide the keywords or an alternative to the keywords shown below, the SELECT statement is evaluated as if you provided the following control card:

```
SELECT          CATDSN=your l i s t,          <---user must provi de
or
DSN=your l i s t, VOL=your l i s t,          <---user must provi de

DSTYPE=ALL, FREESPACE<50,                  <---VSAM default t
I FANY,
CASPLI TR>=10, CI SPLI TR>=10,              <---VSAM default ts
PDSFULL>=90, PDSEXTENTS>=17,              <---PDS default ts
OFULL>=90, PEFULL>=100,    <---I AM default ts (compati ble format onl y)
PCTTRECO>=10, PEUDATAR>=100                <---I AM default ts (all formats)
OVERFLOWI NDEX=1048576                      <---I AM default ts (all formats)
```

If these keywords are not specified on a SELECT statement, the default values will be used for the keywords not specified. If you want the SELECT statement to be evaluated using only the values specified, code the NODEFAULTS keyword.

**25.08 FDRREORG EXAMPLES – SIMULATE**

These examples illustrate some of the FDRREORG options. JOB and JOBLIB/STEPLIB DD statements are not shown and if required must specify the load module library in which FDRREORG resides.

**SIMULATE  
REORG USING  
DEFAULT  
VALUES**

The following example will report on all VSAM, IAM and PDS files requiring reorganization based on default selection values. (See Section 25.07 Defaults). All data sets on volume group TEST will be evaluated.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=6M
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPRPT DD SYSOUT=*
//REORGRPT DD SYSOUT=*
//SYSI N DD *
SI M
SELECT ALLDSN, VOL=TEST*
/*
```

**SIMULATE  
REORG VSAM  
IF BOTH CI/CA  
SPLITS  
EXCEED 10%**

The following example will generate reports of all VSAM data sets that have a high level qualifier of CICSPROD or PROD, and are on volumes that have a volser beginning with CICS or PROD, and that have split more than 10% of the control area's, and more than 10% of the control intervals.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPRPT DD SYSOUT=*
//REORGRPT DD SYSOUT=*
//SYSI N DD *
SI M
SELECT DSN=(CI CSPROD. **, PROD. **), VOL=(CI CS*, PROD*),
DSTYPE=VSAM,
I FALL,
CASPLI TR>10, CI SPLI TR>10
/*
```

**SIMULATE  
REORG VSAM  
IF EITHER THE  
CA SPLITS  
EXCEED 5% or  
CI SPLITS  
EXCEED 10%**

The following example will generate reports of all VSAM data sets that have a high level qualifier of APPLIC from the catalog, and that have split either more than 5% of the control area's, or more than 10% of the control intervals.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPRPT DD SYSOUT=*
//REORGRPT DD SYSOUT=*
//SYSI N DD *
SI M
SELECT CATDSN=APPLI C. **,
DSTYPE=VSAM,
I FANY,
CASPLI TR>5, CI SPLI TR>10
/*
```

CONTINUED . . .

## 25.08 CONTINUED . . .

**SIMULATE  
REORG OF IAM  
FILES IF EITHER  
PE OR  
OVERFLOW  
EXCEED 75%**

The following example will generate reports of all IAM data sets that have \$IAM anywhere in the data set name, and that have used more than 75% of the overflow area or have used more than 75% of the prime extension.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPRPT DD SYSOUT=*
//REORGRPT DD SYSOUT=*
//SYSI N DD *
SI M
SELECT CATDSN=**$I AM**,
DSTYPE=I AM, I FANY,
OFULL>75, PEFULL>75

/*
```

**SIMULATE  
PDS's LARGER  
THAN ONE  
TRACK**

The following example will generate reports of all partitioned data sets that are larger than 1 track and are at least 90% full or are in more than 5 extents that reside on volumes that have a VOLSER beginning with TSO.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=6M
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPRPT DD SYSOUT=*
//REORGRPT DD SYSOUT=*
//SYSI N DD *
SI M
SELECT ALLDSN, VOL=TSO*,
DSTYPE=PDS,
TRKS>1,
I FANY,
PDSFULL>=90, PDSEXTENTS>5

/*
```

**SIMULATE  
PDS's USING  
FDRCOPY**

The following example will report on the number of tracks that would be reclaimed by compressing PDS's with an ending qualifier of CNTL or LOAD on any online volume.

Note: PDS compression can be done with FDRREORG or FDRCOPY. SIMREORG requires that FDR read all used tracks in the selected PDS's.

```
//STEPNAME EXEC PGM=FDRCOPY, REGI ON=2048K
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//SYSI N DD *
SI MREORG TYPE=DSF, DSNENQ=TEST
SELECT DSN=**, CNTL, VOL=*
SELECT DSN=**, LOAD, VOL=*

/*
```

CONTINUED . . .

## 25.08 CONTINUED . . .

**SIMULATE  
COMBINED  
DATA SET  
TYPES**

The following example shows how to select different criteria for different types of data sets. VSAM files will be selected if CA or CI splits exceed 5%. IAM files will be selected if Independent Overflow exceeds 50% and PDS data sets will be selected if they exceed 1 track and are over 80% full.

```
//STEPNAME      EXEC   PGM=FDRREORG, REGI ON=6M
//SYSUDUMP       DD     SYSOUT=*
//SYSPRI NT      DD     SYSOUT=*
//REORGPRPT      DD     SYSOUT=*
//REOGRPT        DD     SYSOUT=*
//SYSI N         DD     *
SIM
SELECT          VOL=(CI CS*, PROD*),
                DSN=(CI CSPROD. **, PROD. **),
                DSTYPE=VSAM,
                I FANY,
                CASPLI TR>5, CI SPLI TR>5
SELECT          VOL=(CI CS*, PROD*),
                DSN=(CI CSPROD. **, PROD. **),
                DSTYPE=I AM,
                OFULL>50
SELECT          DSN=**, VOL=TSO*,
                DSTYPE=PDS,
                TRKS>1,
                PDSFULL>=80
/*
```

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## 25.09 FDRREORG EXAMPLES

**REORG USING  
TEMPORARY  
BACKUPS**

The following example can be used to reorganize all CICSPROD. and PROD. data sets on any volume with a volser beginning with CICS or PROD that have split more than 10% of the control areas or more than 20% of the control intervals. The name of the backup data sets will be the name of the selected data set appended with .BACKUP. Each backup data set will be deleted after the selected data set is reorganized.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096K
//SYSPRI NT DD SYSOUT=*
//REORGPR T DD SYSOUT=*
//REOGRPT DD SYSOUT=*
//SYSI N DD *
REORG BACKUP=TEMP, BACKUPUNI T=SYSDA,
BACKUPI NDEX=++BACKUP
SELECT VOL=(CI CS*, PROD*),
DSN=(CI CSPROD. **, PROD. **),
DSTYPE=VSAM,
I FANY,
CASPLI TR>10, CI SPLI TR>20
```

**REORG USING  
PERMANENT  
BACKUPS**

In this run, BACKUP=PERM is used to keep the backup data sets. If FDRREORG is run at a later date with the same control cards, any backup data sets that were kept from a previous run must be deleted first or the data set will not be reorganized. FDRREORG will not create a backup using the name of an existing cataloged data set.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096K
//SYSPRI NT DD SYSOUT=*
//REORGPR T DD SYSOUT=*
//REOGRPT DD SYSOUT=*
//SYSI N DD *
REORG BACKUP=PERM, BACKUPUNI T=SYSDA,
BACKUPI NDEX=++BACKUP
SELECT VOL=(CI CS*, PROD*),
DSN=(CI CSPROD. **, PROD. **),
DSTYPE=VSAM,
CASPLI TR>10, CI SPLI TR>20
```

**REORG  
USING -  
ALWAYSBACKUP**

To combine an application level backup with reorganization, the ALWAYSBACKUP option can be used. With this option, all data sets that pass the basic selection criteria will be backed up, and any data sets that meet the reorganization criteria will also be reorganized. Use of the ALWAYSBACKUP option requires that the backup data sets be kept. BACKUP=TEMP, if specified or defaulted, will be treated as a keyword error. In the following example, all CICSPROD and PROD.PAYROLL VSAM KSDS's or AIX's will be backed up. If any data sets are encountered that have a CI or CA split ratio greater than 10, will be reorganized after the backup.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=
//SYSPRI NT DD SYSOUT=*
//REORGPR T DD SYSOUT=*
//REOGRPT DD SYSOUT=*
//SYSI N DD *
REORG BACKUP=GDG, BACKUPUNI T=TAPE,
BACKUPI NDEX=++BACKUP
SELECT VOL=(CI CS*, PROD*),
DSN=(CI CSPROD. PAYROLL. **, PROD. PAYROLL. **),
ALWAYSBACKUP,
DSTYPE=VSAM,
I FANY,
CASPLI TR>10, CI SPLI TR>10
```

/ \*

CONTINUED . . .

## 25.09 CONTINUED . . .

**REORG USING  
GDG BACKUPS  
ON TAPE**

The following example will select data sets with high level index of ACCOUNT from the catalog. In this run, BACKUP=GDG is used to keep the backup data sets as generation data sets. Using this method allows the data sets to be kept without having to delete old backups first. FDRREORG will dynamically define the GDG base record if one does not already exist. The backup files will use tape.

```
//STEPNAME      EXEC    PGM=FDRREORG, REGI ON=4096K
//SYSPRI NT      DD      SYSOUT=*
//REORGPRPT      DD      SYSOUT=*
//REOGRPT        DD      SYSOUT=*
//SYSI N         DD      *
REORG            BACKUP=GDG, BACKUPUNI T=3480,
                  BACKUPI NDEX=++BACKUP
SELECT          CATDSN=ACCOUNT. **,
                  DSTYPE=VSAM,
                  I FANY,
                  CASPLI TR>5, CI SPLI TR>10
```

**REORG  
SPECIFIC  
DATA SETS**

The following example demonstrates how to select specific data sets for reorganization whether they require reorganization or not. All VSAM, IAM or PDS data sets with a second index level of ACCOUNT will be selected from volumes ACCT01, ACCT09 and ACCT10.

```
//STEPNAME      EXEC    PGM=FDRREORG, REGI ON=6M
//SYSPRI NT      DD      SYSOUT=*
//REORGPRPT      DD      SYSOUT=*
//REOGRPT        DD      SYSOUT=*
//SYSI N         DD      *
REORG            NODEFAULTS
SELECT          DSN=*. ACCOUNT. **,
                  VOL=(ACCT01, ACCT09, ACCT10)
```

**REORG VSAM  
IF ANY SPLITS  
OCCUR**

The following examples will reorganize any VSAM file with an ending index level of cluster and have experienced any CI or CA splits.

```
//STEPNAME      EXEC    PGM=FDRREORG, REGI ON=6M
//SYSPRI NT      DD      SYSOUT=*
//REORGPRPT      DD      SYSOUT=*
//REOGRPT        DD      SYSOUT=*
//SYSI N         DD      *
REORG            NODEFAULTS
SELECT          DSN=**. CLUSTER, VOL=PAY*,
                  DSTYPE=VSAM,
                  NCI SPLI TS>0, NCASPLI TS>0
```

**REORG USING  
- NOREORG**

FDRREORG can be used to take application level backups by using the NOREORG option. With this option, all data sets that meet the selection criteria will be backed up but not reorganized. Use of the NOREORG option requires that the backup data sets be kept. BACKUP=TEMP, if specified or defaulted, will be treated as a keyword error. In the following example, all CICSPROD and PROD.PAYROLL VSAM KSDS's or AIX's will be backed up.

NOTE: The RECOVER command is not designed to restore these backups. You can use an IDCAMS REPRO JOB to reload these data sets.

```
//STEPNAME      EXEC    PGM=FDRREORG, REGI ON=. . . .
//SYSPRI NT      DD      SYSOUT=*
//REORGPRPT      DD      SYSOUT=*
//REOGRPT        DD      SYSOUT=*
//SYSI N         DD      *
REORG            NODEFAULTS, BACKUP=GDG, BACKUPUNI T=TAPE,
                  BACKUPI NDEX=++BACKUP
SELECT          VOL=(CI CS*, PROD*),
                  DSN=(CI CSPROD. PAYROLL. **, PROD. PAYROLL. **),
                  DSTYPE=VSAM,
                  NOREORG
```

CONTINUED . . .

## 25.09 CONTINUED . . .

**REORG USING AN EXCLUDE** The following example will select data sets starting with CICSPROD or PROD with the exception of any data sets that have a second level qualifier of PAYROLL. Note that control cards are processed in the order you enter them. If the EXCLUDE statement was placed after the SELECT statement, the CICSPROD.PAYROLL and PROD.PAYROLL data sets would be reorganized because they would be selected before the EXCLUDE statement is processed. The backup data set name will use the RACF userid as its high level index and will go to SMS STORCLAS of TEMPDISK.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPRT DD SYSOUT=*
//REORGRPT DD SYSOUT=*
//SYSI N DD *
REORG BACKUP=TEMP, BACKUPSTORCLASS=TEMPDI SK,
BACKUPI NDEX=&RACFUI D. ++BACKUP
EXCLUDE DSN=(CI CSPROD. PAYROLL. **, PROD. PAYROLL. **)
SELECT VOL=(CI CS*, PROD*),
DSN=(CI CSPROD. **, PROD. **),
DSTYPE=VSAM,
I FANY,
CASPLI TR>10, CI SPLI TR>20
/*
```

**REORG USING CRDAYS** The following example will select VSAM files with an additional filter limiting the selection to datasets created within the last two days. This might be useful if new datasets were defined with incorrect free space parameters that have been modified to the correct values with an IDCAMS alter command. By reorganizing these datasets, they will be reloaded using the new free space parameters.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPRT DD SYSOUT=*
//REORGRPT DD SYSOUT=*
//SYSI N DD *
REORG BACKUP=TEMP, BACKUPUNI T=SYSDA,
BACKUPI NDEX=++BACKUP
SELECT VOL=(CI CS*, PROD*),
DSN=(CI CSPROD. **, PROD. **),
DSTYPE=VSAM,
CRDAYS<=2 <---select if created in last 2 days
```

You could also achieve the same results by using specific dates as shown in the following example. This example also demonstrates how to specify a low and high range for selection.

```
REORG BACKUP=TEMP, BACKUPUNI T=SYSDA,
BACKUPI NDEX=++BACKUP
SELECT VOL=(CI CS*, PROD*),
DSN=(CI CSPROD. **, PROD. **),
DSTYPE=VSAM,
CRDATE>=96001, CRDATE<=96002 <---date range
or
CRDATE>=1996001, CRDATE<=1996002
/*
```

CONTINUED . . .

## 25.09 CONTINUED . . .

**REORG USING LAST REFERENCE DATE AS FILTERS** The last reference date can also be used as a filter. Use LRDATE if you want to filter on a specific date. Use LRDAY5 to filter based on days since last reference.

The following example will select partitioned datasets that have been referenced within the last 7 days and are more than 80% full. This allows FDR to bypass PDS's that have not been referenced in some time and most likely do not require compression.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=6M
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPR T DD SYSOUT=*
//REOGRPT DD SYSOUT=*
//SYSI N DD *
REORG
SELECT ALLDSN, VOL=TSO*,
        DSTYPE=PDS,
        LRDAY5<=7, <---referenced in last 7 days
        PDSFULL>80 <---must be more than 80% full
/*
```

**COMPRESS PDS's USING FDRCOPY FOR PERFORMANCE** The following example uses FDRCOPY to compress a large number of PDS data sets. FDRCOPY can be used instead of FDRREORG to compress PDS data sets if the special features of FDRREORG (ex: extra selection criteria, etc.) are not required. FDRCOPY reduces the overhead of compressing large number of data sets yielding optimum performance.

```
//STEPNAME EXEC PGM=FDRCOPY, REGI ON=2M
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//SYSI N DD *
REORG TYPE=DSF
SELECT ALLDSN, VOL=*
/*
```

**REORG LARGE FILES TO TAPE SMALL TO DISK** The following example will reorganize VSAM and IAM files based on default selection criteria. Files 100 cylinders or larger will use tape as the backup medium. Files under 100 cylinders will use disk for the backups. Since a large number of volumes will be processed 8 subtasks will be used.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=8M
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPR T DD SYSOUT=*
//REOGRPT DD *
//SYSI N DD *
REORG DATA=USED, MAXTASKS=8, BACKUPUNI T=DI SK
SELECT ALLDSN, VOL=MANY*, DSTYPE=( VSAM, I AM) , CYLS<100
REORG DATA=USED, MAXTASKS=8, BACKUPUNI T=TAPE
SELECT ALLDSN, VOL=MANY*, DSTYPE=( VSAM, I AM) , CYLS>=100
/*
```

**CHANGING THE SPACE ALLOCATION OF A VSAM CLUSTER** In the following example, the physical allocation of a VSAM cluster will be changed. The data component will be allocated with 100 cylinders primary and 20 cylinders secondary. The index component will be allocated with 5 tracks primary and 1 track secondary.

```
//JOBNAME JOB , . . . .
//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPR T DD SYSOUT=*
//REOGRPT DD SYSOUT=*
//SYSI N DD *
REORG NODEFAULTS, NOUPDATES=YES
SELECT CATDSN=VSAM. CLUSTER,
        NEWCYLSDATA=( 100, 20) , NEWTRKSI NDEX=( 5, 1)
/*
```

CONTINUED . . .

## 25.09 CONTINUED . . .

**MOVING VSAM DATA SETS** In the following example, the data and index components of a VSAM cluster will be redefined on volume VSAM01.

```
//JOBNAME      JOB      , . . . .
//STEPNAME     EXEC     PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP      DD      SYSOUT=*
//SYSPRI NT     DD      SYSOUT=*
//REORGPRPT     DD      SYSOUT=*
//REORGRPT      DD      SYSOUT=*
//SYSI N        DD      *
      REORG      NODEFAULTS, NOUPDATES=YES
      SELECT     CATDSN=VSAM. CLUSTER,
                  NEWVOLSDATA=VSAM01, NEWVOLSI NDEX=VSAM01
/*
```

**MOVING VSAM DATA SETS WITH ALTERNATE INDEXES** In the following example, the data and index components of a VSAM cluster will be redefined on volume VSAM01. By specifying MOVEAIX=YES, any alternate indexes of this VSAM cluster will also be redefined on volume VSAM01. If MOVEAIX=YES is not specified, the default is NO and the alternate indexes will be defined on their original volumes.

```
//JOBNAME      JOB      , . . . .
//STEPNAME     EXEC     PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP      DD      SYSOUT=*
//SYSPRI NT     DD      SYSOUT=*
//REORGPRPT     DD      SYSOUT=*
//REORGRPT      DD      SYSOUT=*
//SYSI N        DD      *
      REORG      NODEFAULTS, NOUPDATES=YES, MOVEAI X=YES
      SELECT     CATDSN=VSAM. CLUSTER,
                  NEWVOLSDATA=VSAM01, NEWVOLSI NDEX=VSAM01
/*
```

**CONVERT A NON-SMS VSAM CLUSTER TO AN SMS MANAGED CLUSTER** In the following example, a VSAM cluster will be redefined as an SMS managed cluster. Please note that the installation ACS routines can override the requested storage class or indicate that the cluster should be defined as a NON-SMS managed cluster.

```
//JOBNAME      JOB      , . . . .
//STEPNAME     EXEC     PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP      DD      SYSOUT=*
//SYSPRI NT     DD      SYSOUT=*
//REORGPRPT     DD      SYSOUT=*
//REORGRPT      DD      SYSOUT=*
//SYSI N        DD      *
      REORG      NODEFAULTS, NOUPDATES=YES
      SELECT     CATDSN=VSAM. CLUSTER, NEWSTORCLASS=PROD
/*
```

**CHANGING THE SPACE ALLOCATION OF AN IAM DATASET** In the following example, the physical allocation of an IAM dataset will be changed. The file will be allocated with 100 cylinders primary and 20 cylinders secondary.

```
//JOBNAME      JOB      , . . . .
//STEPNAME     EXEC     PGM=FDRREORG, REGI ON=OM
//SYSUDUMP      DD      SYSOUT=*
//SYSPRI NT     DD      SYSOUT=*
//REORGPRPT     DD      SYSOUT=*
//REORGRPT      DD      SYSOUT=*
//SYSI N        DD      *
      REORG      NODEFAULTS, NOUPDATES=YES
      SELECT     CATDSN=I AM. DATASET, NEWCYLSDATA=( 100, 20)
/*
```

CONTINUED . . .

## 25.09 CONTINUED . . .

**MOVING IAM DATASETS** In the following example, an IAM dataset will be redefined on volume IAM001.

```
//JOBNAME      JOB      , . . . .
//STEPNAME     EXEC     PGM=FDRREORG, REGI ON=OM
//SYSUDUMP      DD      SYSOUT=*
//SYSPRI NT     DD      SYSOUT=*
//REORGPRPT     DD      SYSOUT=*
//REORGRPT      DD      SYSOUT=*
//SYSI N        DD      *
                REORG     NODEFAULTS, NOUPDATES=YES
                SELECT     CATDSN=I AM. DATASET, NEWVOLSDATA=I AM001
/*
```

**CONVERT A NON-SMS IAM DATASET TO AN SMS MANAGED DATASET** In the following example, an IAM dataset will be redefined as an SMS managed dataset. Please note that the installation ACS routines can override the requested storage class or indicate that the dataset should be defined as a NON-SMS managed dataset.

```
//JOBNAME      JOB      , . . . .
//STEPNAME     EXEC     PGM=FDRREORG, REGI ON=OM
//SYSUDUMP      DD      SYSOUT=*
//SYSPRI NT     DD      SYSOUT=*
//REORGPRPT     DD      SYSOUT=*
//REORGRPT      DD      SYSOUT=*
//SYSI N        DD      *
                REORG     NODEFAULTS, NOUPDATES=YES
                SELECT     CATDSN=I AM. DATASET, NEWSTORCLASS=PROD
/*
```

**PARALLEL MODE REORGANIZATION** In the following example, FDRREORG is run in parallel mode for a multi-volume IAM and VSAM file. A maximum of 9 parallel tasks per dataset are allowed as specified by the MAXP keyword. Note that if the two datasets are using space on 9 or more volumes, 18 tape drives will be allocated assuming that the first volume of each dataset are not the same.

```
//JOBNAME      JOB      , . . . .
//STEPNAME     EXEC     PGM=FDRREORG, REGI ON=OM
//SYSUDUMP      DD      SYSOUT=*
//SYSPRI NT     DD      SYSOUT=*
//REORGPRPT     DD      SYSOUT=*
//REORGRPT      DD      SYSOUT=*
//SYSI N        DD      *
                REORG     MODE=P, MAXP=9, BACKUPUNI T=3480, MAXT=2,
                        BACKUPI NDEX=++BACKUP?
                SELECT     CATDSN=( VSAM. CLUSTER, I AM. DATASET)
```

**COMBINED PARALLEL AND SINGLE MODE REORGANIZATION** In the following example, FDRREORG is first run in parallel mode for multi-volume IAM and VSAM files. After all of the parallel mode reorganizations are complete, the second REORG and SELECT statements will reorganize all of the datasets that were not reorganized in parallel mode. A maximum of 5 parallel tasks per dataset are allowed as specified by the MAXP keyword. The MAXTASKS keyword has not been specified which will cause FDRREORG to use the default value of 4 if the default has not been changed in the FDRREORG option table. This means that the parallel portion of the reorganization could require 20 tape drives, 4 datasets times 5 parallel backups per dataset. To use less tape drives, specify smaller values for MAXP and MAXTASKS.

```
//JOBNAME      JOB      , . . . .
//STEPNAME     EXEC     PGM=FDRREORG, REGI ON=OM
//SYSUDUMP      DD      SYSOUT=*
//SYSPRI NT     DD      SYSOUT=*
//REORGPRPT     DD      SYSOUT=*
//REORGRPT      DD      SYSOUT=*
//SYSI N        DD      *
                REORG     MODE=P, MAXP=5, BACKUPUNI T=3480, BACKUPI NDEX=++BACKUP?
                        DSTYPE=( I AM, VSAM)
                SELECT     CATDSN=( PROD. **)
                REORG     MODE=S, BACKUPUNI T=3480, BACKUPI NDEX=++BACKUP,
                        DSTYPE=( I AM, VSAM)
                SELECT     CATDSN=( PROD. **)
```

CONTINUED . . .

## 25.09 CONTINUED . . .

**REORG  
EXAMPLES –  
UNAVAILABLE  
DATASETS**

If datasets are in use at the time FDRREORG selects them for processing, they will normally be bypassed. In some cases it might be critical that certain datasets be reorganized before starting an on-line region, or before starting a production job stream. In other cases the dataset might become available before FDRREORG processing is complete. These situations can be handled by using the DSNRETRY parameter. For datasets that you would like processed if they become available, you can use DSNRETRY=RETRY or DSNRETRY=ENQ. Specifying RETRY instructs FDRREORG to make repeated attempts to allocate the dataset during the normal course of processing. If the dataset is successfully allocated, it will be processed. ENQ instructs FDRREORG to leave pending a SYSDSN enqueue for the dataset. This ensures that FDRREORG will obtain ownership of the dataset as soon as it becomes available. If the dataset enqueue is not obtained before the task that selected the dataset completes, the pending SYSDSN enqueue will be released and the dataset will not be processed. For those situations where it is critical that datasets be reorganized, you can specify DSNRETRY=WAIT. In this case, the task that selected the dataset will wait for the SYSDSN enqueue to be obtained and will not terminate until all datasets selected with DSNRETRY=WAIT have been processed. We have added RUNTIME=60 to the REORG statement which instructs FDRREORG to stop processing after 60 minutes. If RUNTIME was not specified on the REORG statement, or an operator STOP (P) command would have to be issued in the event that a dataset queued for retry processing with the wait option will be unavailable for a long period of time.

The following example demonstrate how to use the various DSNRETRY options. The first SELECT statement causes each task to wait for CICS PROD. datasets on CICSxx volumes that are not available when selected. The second SELECT statement causes each task to issue a SYSDSN enqueue for PROD. datasets on PRODxx volumes that are 1000 cylinders or smaller. These datasets will not be processed if they do not become available before the task that selected the datasets completes its processing. The third SELECT statement causes each task to make repeated attempts to allocate PROD. datasets on PRODxx volumes that are larger than 1000 cylinders. A SYSDSN enqueue will not be issued for these datasets and they will not be processed if all allocation attempts are unsuccessful.

```
//STEPNAME      EXEC   PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP       DD     SYSOUT=*
//SYSPRI NT      DD     SYSOUT=*
//REORGPRPT      DD     SYSOUT=*
//REOGRPT        DD     SYSOUT=*
//SYSIN          DD     *
  REORG          BACKUP=TEMP, BACKUPUNIT=SYSDA,
                  BACKUPINDEX=++BACKUP,
                  DATA=USED,
                  DSTYPE=VSAM,
                  RUNTIME=60
  SELECT         VOL=(CICS*),
                  DSN=(CICS PROD. **),
                  IFANY, CASPLI TR>10, CISP LI TR>20,
                  DSNRETRY=WAIT
  SELECT         VOL=(PROD*),
                  DSN=(PROD. **),
                  CYLS<=1000,
                  IFANY, CASPLI TR>10, CISP LI TR>20,
                  DSNRETRY=ENQ
  SELECT         VOL=(PROD*),
                  DSN=(PROD. **),
                  CYLS>1000,
                  IFANY, CASPLI TR>10, CISP LI TR>20,
                  DSNRETRY=RETRY
/*
```

## 25.10 FDRREORG RECOVER EXAMPLES

**RECOVERY** The following sample control card demonstrates how you can recover from a failed reorganization.  
**EXAMPLE** This example assumes that the jobname of the failed reorganization job was MYREORG.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPRPT DD SYSOUT=*
//REORGRPT DD SYSOUT=*
//SYSI N DD *
RECOVER JOBNAME=MYREORG
/*
```

The RECOVER command assumes that you want to complete reload processing for all datasets found in the checkpoint or log files. You can use the DSN keyword to provide a dataset or dataset filter list to limit recovery processing to those datasets you provide, or you can use the EXDSN keyword to exclude datasets from recovery processing. The following sample control cards demonstrate how you can use the DSN or EXDSN keywords. In the first example, only datasets with a high level index of PROD will be recovered. In the second example, only datasets that do not have a high level index of PROD will be recovered.

```
//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPRPT DD SYSOUT=*
//REORGRPT DD SYSOUT=*
//SYSI N DD *
RECOVER JOBNAME=MYREORG, DSN=PROD. **
/*

//STEPNAME EXEC PGM=FDRREORG, REGI ON=4096K
//SYSUDUMP DD SYSOUT=*
//SYSPRI NT DD SYSOUT=*
//REORGPRPT DD SYSOUT=*
//REORGRPT DD SYSOUT=*
//SYSI N DD *
RECOVER JOBNAME=MYREORG, EXDSN=PROD. **
/*
```



**26.01 FDRREORG OPTION CHANGE FACILITY – OVERVIEW AND JCL**

The FDRREORG Option Change Facility gives the user a simple method of modifying installation options for executing FDRREORG. The installation options include default selection criteria, special features in FDRREORG, and other processing options. This facility supplies the user with the ability to PRINT present global option values, change values and RESET options to their original values as supplied on the installation tape. You should carefully review the options available for FDRREORG.

**BATCH  
EXECUTION**

To execute FDRREOZO as a BATCH job use the following JCL:

**JOB CONTROL  
REQUIRE-  
MENTS**

The JOB Statement is user specified and depends upon installation standards.

**EXEC  
STATEMENT**

Must specify the program name of the FDRREORG Option Change Facility – FDRREOZO.

**STEPLIB or  
JOB LIB DD  
STATEMENT**

If required, must specify the load module library in which FDRREORG resides.

**SYS PRINT DD  
STATEMENT**

Specifies the output message data set. This is a required DD statement and usually is a SYSOUT data set.

**SYS LIB DD  
STATEMENT**

Must specify the load module library in which FDRREORG resides.

**SYS IN DD  
STATEMENT**

Specifies the control statement data set required for all functions. Usually an input stream or DD \* dataset.

**TSO  
EXECUTION**

The FDRREORG OPTION CHANGE FACILITY program (FDRREOZO) can be executed under TSO. The program will prompt the user for the commands. 'END' will save the new options, if any, and terminate the program. The allocations required to execute FDRREOZO in the TSO Foreground are as follows:

```
ALLOC  F(SYSLIB) DA('fdrreorg.library') SHR
ALLOC  F(SYSPRINT) DA(*)
ALLOC  F(SYSIN) DA(*)
FDRREOZO
```

---- or if the FDRREORG library is not in LINKLIST ----

```
CALL 'fdrreorg.library'(FDRREOZO)'
```

**26.02 FDRREORG OPTION CHANGE FACILITY – FORMAT AND OPTIONS****AVAILABLE  
FUNCTIONS**

The Option Change Facility has the following commands:

- CANCEL** – Terminates FDRREOZO without updating the Options Table.  
The CANCEL command format is: **CANCEL**
- END** – Terminates FDRREOZO processing and rewrites the Option Table if any option was changed. This command is intended for TSO users.  
The END command format is: **END**
- HELP** – The HELP command will print or display a menu of the FDRREOZO options and related documentation.  
The HELP command format is: **HELP ALL**
- NOREORG** – The NOREORG command adds entries to the user modifiable section of the noreorg list which is located in the FDRNORG load module. The operands for this command are documented in the following section.  
The NOREORG command format is:  
**NOREORG DSN=...,VOL=...**
- PRINT** – If PRINT is specified, FDRREOZO will print or display the current values in the FDRREORG Options table and/or the NOREORG list.  
The PRINT command format is:  
**PRINT or  
PRINT NOREORG or  
PRINT ALL**
- RESET** – If RESET is specified, FDRREOZO will reset the FDRREORG Options to the original values on the installation tape and/or reset the NOREORG list by removing all entries from the user modifiable section of the NOREORG list.  
The RESET command format is:  
**RESET or  
RESET NOREORG or  
RESET ALL**
- ZAP** – Modify the FDRREORG Options. This command can be used to modify specified processing options for FDRREORG. The operands for this command are documented by function in the following sections.  
The ZAP command format is:  
**ZAP operand=value, ...operand=value**

**The NOREORG  
COMMAND**

**NOREORG**                      **DSN=(...,...)**                      **,VOL=(...,...)**

**DSN=** Specifies a dataset, dataset list, filter, or filter list, that defines the datasets which should be excluded from REORG processing. This operand can be specified with or without a volume list. If a volume list is not provided, FDRREORG will exclude a matching name from this entry on all volumes.

**VOL=** Specifies a volume, volume list, volume group, or volume group list, that defines the volumes which should be excluded from REORG processing. This operand can be specified with or without a dataset list. If a dataset list is not provided, the entire volume will be excluded.

## 26.03 The ZAP COMMAND

## ZAP

Default VSAM  
Selection Criteria

CASPLITR=nnnnn

,CISPLITR=nnnnn

,FREESPACE=nnn

Default IAM  
Selection Criteria

,OFULL=nnn

,OVERFLOWINDEX=nnnnnnnnn

,PCTTRECO=nnn

,PEFULL=nnn

,PEUDATAR=nnn

Default PDS  
Selection Criteria

,PDSFULL=nnn

,PDSEXTENTS=nn

## REORG SIMULATE And RECOVER Defaults

,ALIASCHECK=CCC

,AUTOSPACE=CCC

,BACKUP=CCCC

,BACKUPALLOC=CCCC

,BACKUPDATACLASS=CCCCCCCC

,BACKUPFAILURE=CCCCC

,BACKUPINDEX=CCCCCCCC

,BACKUPMGMTCLASS=CCCCCCCC

,BACKUPRETPD=nnn

,BACKUPSTORCLASS=CCCCCCCC

,BACKUPUNIT=CCCCCCCC

,BACKUPUNITS=n

,CKPTALLOC=CCCC

,CKPTDATACLASS=CCCCCCCC

,CKPTMGMTCLASS=CCCCCCCC

,CKPTPREFIX=CCCCCCCC

,CKPTSTORCLASS=CCCCCCCC

,CKPTUNIT=CCCCCCCC

,IAMCOMPPERM=CCC

,IAMCOMPTEMP=CCC

,IAMDEFINE=CCC

,KEEPCRDATE=CCC

,LASTAPEPREFIX=CCCCCCCC

,LISTNOREORG=CCC

,LOGALLOC=CCCC

,LOGDATACLASS=CCCCCCCC

,LOGMGMTCLASS=CCCCCCCC

,LOGPREFIX=CCCCCCCC

,LOGSTORCLASS=CCCCCCCC

,LOGUNIT=CCCCCCCC

,MAXENQ=nnn

,MAXENVERR=nnnnn

,MAXFILE=nnn

,MAXSYSERR=nnnnn

,MAXTASKS=nn

,MSGLEVEL=C

,MSGTIMESTAMP=CCC

,NOUPDATES=CCC

,OWNERSTRING=CCCC

,POOLDASD=CCC

,RECORDCOUNTS=CCC

,SELTERR=CCC

,SORTRPT=CCC

,SUBTASKABEND=CCCC

,UPDATEDPDS=CCC

,VSAMDEFINE=CCCCC

CONTINUED . . .

## 26.03 CONTINUED . . .

**ALIASCHECK=** Specifies the default option for verifying if an alias exists for generated backup data set names. If YES is specified and an alias does not exist, the backup or reorganization will not be performed. If NO is specified and an alias does not exist, the backup data set will be cataloged in the master catalog if the proper authority exists for the job.

**YES** – Check for an existing alias and fail the backup or reorganization if one does not exist.

**NO** – Do not check for an existing alias.

The default is YES.

**AUTOSPACE=** Specifies if FDRREORG should attempt to increase the space allocation of single volume IAM or VSAM datasets if a reload fails due to an out of space condition. If YES is specified, FDRREORG will calculate how much additional space is required to reload the dataset. The dataset will then be redefined with additional space and the reload will be retried.

**YES** – Out of space failures will be handled by FDRREORG.

**NO** – Out of space failures will not be handled by FDRREORG.

The default is YES.

Note – This feature is deactivated for datasets redefined at reload time with space parameters provided via the NEWCYLS, NEWTRKS, or NEWRECS keywords for the data or index components.

For IAM datasets, this feature requires IAM 6.3 or above. Additionally, files defined with an earlier release of IAM will not be supported by this feature until they are first redefined with IAM 6.3 or above.

**BACKUP=** Defines the default disposition of the backup datasets after the target dataset has been successfully reorganized.

**TEMP** – Backup datasets on DASD will be deleted and uncataloged. Backup datasets on TAPE will be uncataloged.

**PERM** – Backup datasets on DASD will not be deleted and uncataloged. Backup datasets on TAPE will not be uncataloged.

**GDG** – Same as PERM except backup datasets will be a +1 generation dataset. REORG will dynamically define any generation data groups that do not already exist. The high level qualifier of the dynamically generated generation data groups must be aliased to an ICF catalog.

The default is TEMP.

**BACKUPALLOC=**  
**BACKUPA** Defines the allocation method to use when allocating backup datasets.

**SMS** – Allocate by SMS storage class.

**UNIT** – Allocate by unit name.

Note – If SMS is specified, a valid SMS storage class name must also be specified for BACKUPSTORCLASS. If UNIT is specified, a valid unit name must also be specified for BACKUPUNIT.

The default is UNIT.

**BACKUPDATACLASS=**  
**BACKUPD** Defines the default SMS data class to use for backup datasets when BACKUPALLOC is SMS.

CONTINUED . . .

## 26.03 CONTINUED . . .

<b>BACKUPFAILURE=</b>	<p>Defines how FDRREORG should treat a backup failure that occurs as part of a reorganization. Backup failures that occur as a result of data sets selected via the NOREORG or ALWAYSBACKUP keywords will always be treated as an error.</p> <p><b>ERROR</b> – The failure is treated as an error and will result in a return code of 8.</p> <p><b>WARNING</b> – The failure is treated as a warning and will result in a return code of 4.</p> <p>The default is ERROR.</p>
<b>BACKUPINDEX=</b> <b>BACKUPI</b>	<p>Defines the default pattern to be used to add or delete index levels when generating the backup dataset name. REORG will use each index level specified in BACKUPINDEX in place of the original index level. If a period is specified without any characters following, the original index level will be copied to the backup dataset name. If + is specified, the character following the + will be inserted into the backup dataset name as a new index level. If ++ is specified, the characters following the ++ will be added to the end of the backup dataset name as a new index level. If – is specified, the index level will be dropped from the backup dataset name. You can specify a special identifier of &amp;RACFUID or &amp;RACFGID to indicate that the RACF user id or RACF group id be used. See the description of the SELECT command for examples.</p> <p>The default is ++BACKUP.</p>
<b>BACKUPMGMTCLASS=</b> <b>BACKUPM</b>	<p>Defines the default SMS management class to use for backup datasets when BACKUPALLOC is SMS.</p>
<b>BACKUPRETPD=</b> <b>BACKUPR</b>	<p>Defines the default retention period to be used for backup datasets.</p> <p>The default is 0.</p>
<b>BACKUPSTORCLASS=</b> <b>BACKUPS</b>	<p>Defines a valid SMS storage class which will be used to allocate backup datasets when BACKUPALLOC is SMS.</p>
<b>BACKUPUNIT=</b>	<p>Defines a valid unit name containing tape or disk devices to be used for allocating backup datasets when BACKUPALLOC is UNIT. The unit name specified must not define a group of devices that contain a mixture of device classes (ie. 3480's and 3380's) . It is allowed to use a unit name that defines a group of devices with a mixture of device models (ie. 3380's and 3390's).</p> <p>The default is SYSDA.</p>
<b>BACKUPUNITS=</b>	<p>For backup datasets on tape, this operand defines the number of units to be allocated for backup datasets for each task. For backup datasets on disk, this operand defines the minimum number of units to be allocated for each backup dataset. REORG will dynamically increase the number of disk units for a disk backup dataset to ensure that sufficient space is available to backup the target dataset.</p> <p>The default is 1.</p>
<b>CASPLITR=</b> <b>CA</b>	<p>Defines the default minimum ratio of Control Area splits to every 100 Control Area's in a VSAM KSDS.</p> <p>The default is 10.</p>
<b>CISPLITR=</b> <b>CI</b>	<p>Defines the default minimum ratio of Control Interval splits to every 100 Control Interval's in a VSAM KSDS.</p> <p>The default is 10.</p>

CONTINUED . . .

## 26.03 CONTINUED . . .

**CKPTALLOC=** Defines the allocation method to use when allocating the checkpoint dataset.  
**CKPTA**

**SMS** – Allocate by SMS storage class.

**UNIT** – Allocate by unit name.

Note – If SMS is specified, a valid SMS storage class name must also be specified for CKPTSTORCLASS. If UNIT is specified, a valid unit name must also be specified for CKPTUNIT.

The default is UNIT.

**CKPTDATACLASS=** Specifies the SMS data class to use when CKPTALLOC is SMS.  
**CKPTD**

**CKPTMGMTCLASS=** Specifies the SMS management class to use when CKPTALLOC is SMS.  
**CKPTM**

**CKPTPREFIX=** Specifies the high level qualifier to use when constructing the name of the  
**CKPTP** checkpoint file. To make it possible for the RECOVER command to find the checkpoint file for a failed REORG, the checkpoint dataset is cataloged with a name of &CKPTPREFIX.REORGCKP.jobname.Dccyyddd.Thhmmss. You can specify a special identifier of &RACFUID or &RACFGID to indicate that the RACF user id or RACF group id be used.

The default is FDRREORG.

**CKPTSTORCLASS=** Specifies the default SMS storage class to use when CKPTALLOC is SMS.  
**CKPTS**

**CKPTUNIT=** Defines a valid unit name containing disk devices to use when CKPTALLOC is  
**CKPTU** UNIT.

The default is SYSDA.

**IAMCOMPPERM=** Specifies if FDRREORG should backup compressed IAM datasets in  
**IAMCOMPP** compressed format when BACKUP=GDG or BACKUP=PERM has been specified.

**YES** – Backups will be in compressed format.

**NO** – Backups will not be in compressed format.

The default is NO.

Note – This feature requires IAM 6.3 or above and is only supported for files in enhanced format.

**IAMCOMPTEMP=** Specifies if FDRREORG should backup compressed IAM datasets in  
**IAMCOMPT** compressed format when BACKUP=TEMP has been specified.

**YES** – Backups will be in compressed format.

**NO** – Backups will not be in compressed format.

The default is YES.

Note – This feature requires IAM 6.3 or above and is only supported for files in enhanced format.

CONTINUED . . .

## 26.03 CONTINUED . . .

<b>IAMDEFINE= IAMDEF</b>	<p>Specifies the default option for deleting and defining IAM datasets that will be reorganized.</p> <p><b>YES</b> – IAM datasets will be deleted and defined before reloading. <b>NO</b> – IAM datasets will not be deleted and defined before reloading.</p> <p>The default is NO.</p> <p>Note – This feature requires IAM 6.3 or above. Additionally, files defined with an earlier release of IAM will not be redefined by FDRREORG until they are first redefined with IAM 6.3 or above.</p>
<b>KEEPCRDATE=</b>	<p>Specifies if FDRREORG should retain the original creation date when redefining VSAM.</p> <p><b>YES</b> – FDRREORG will retain the original creation date. <b>NO</b> – FDRREORG will use the current date.</p> <p>The default is YES.</p>
<b>FREESPACE= FREESP</b>	<p>Defines the default selection cut off for VSAM CA or CI free space percent. This value is used to prevent reorganizations of VSAM KSDS's or AIX's that have very high free space percentages. To reduce splits for some files in online systems, some VSAM files are loaded with little or no free space and then altered to have a very high CA and/or CI freespace percent. If these files are processed by FDRREORG, the current freespace percentage is used resulting in a dramatic increase in space.</p> <p>The default is 50.</p>
<b>LASTAPEPREFIX= LASTAPEP</b>	<p>Specifies the high level qualifier to be used when cataloging or locating the special LASTAPE catalog entries. You can specify a special identifier of &amp;RACFUID or &amp;RACFGID to indicate that the RACF user id or RACF group id be used.</p> <p>The default is FDRREORG.</p>
<b>LISTNOREORG= LISTNOR</b>	<p>Specifies the default option for printing the NOREORG list for REORG or SIMULATE functions.</p> <p><b>YES</b> – The NOREORG list is printed for REORG or SIMULATE functions. <b>NO</b> – The NOREORG list is not printed.</p> <p>The default is YES.</p>
<b>LOGALLOC= LOGA</b>	<p>Defines the allocation method to use when allocating the log dataset.</p> <p><b>SMS</b> – Allocate by SMS storage class. <b>UNIT</b> – Allocate by unit name.</p> <p>Note – If SMS is specified, a valid SMS storage class name must also be specified for LOGSTORCLASS. If UNIT is specified, a valid unit name must also be specified for LOGUNIT.</p> <p>The default is UNIT.</p>
<b>LOGDATACLASS=</b>	<p>Specifies the SMS data class to use when LOGALLOC is SMS.</p>
<b>LOGMGMTCLASS=</b>	<p>Specifies the SMS management class to use when LOGALLOC is SMS.</p>

CONTINUED . . .

## 26.03 CONTINUED . . .

**LOGPREFIX=**  
**LOGP** Specifies the high level qualifier to use when constructing the name of the log file. To make it possible for the RECOVER command to find the log file, the log dataset is cataloged with a name of &LOGPREFIX.REORGLOG.jobname.Dccyyddd.Thhmmss. You can specify a special identifier of &RACFUID or &RACFGID to indicate that the RACF user id or RACF group id be used.

The default is FDRREORG.

**LOGSTORCLASS=** Specifies the SMS storage class to use when LOCALLOC is SMS.

**LOGUNIT=** Defines a valid unit name containing disk devices to use when LOGALLOC is UNIT.

The default is SYSDA.

**MAXENQ=** Specifies the maximum number of outstanding enqueue's allowed for the DSNRETRY ENQ and WAIT options for each volume processor task. When this limit is reached, datasets will be added to task retry queue as if the RETRY option was specified. The enqueue will be issued when the outstanding enqueue count falls below this maximum. Once the volume processor task has completed processing all volumes and is waiting for datasets queued with the WAIT option, no additional enqueue's will be issued.

The default is 999.

**MAXENVERR=**  
**MAXENV** Specifies the maximum number of environmental errors allowed. When this limit is reached, all subtasks will terminate after processing the currently active dataset. No additional REORG or SIMULATE commands will be processed. Environmental errors are any backup or re-load failures not caused by a system abend. Insufficient space, or target dataset not available, are examples of environmental errors.

The default is 99.

**MAXFILE=** Specifies the maximum number of backup files to place on a single tape volume.

The default is 255.

**MAXSYSERR=**  
**MAXS** Specifies the maximum number of system abends allowed. When this limit is reached, all subtasks will terminate after processing the currently active dataset. No additional REORG or SIMULATE commands will be processed.

The default is 99.

**MAXTASKS=**  
**MAXT** Specifies the maximum number of concurrent volumes to be processed. You may specify any number from 1 to 15, inclusive. Please note that the actual number of subtasks possible is limited by the amount of available virtual storage. For SIMULATE commands with MAXTASKS=15, a region size of 2.5 megabytes should be sufficient on an XA or ESA system. For non-XA systems, a region size of 5 megabytes should be sufficient. For REORG commands with MAXTASKS=15, a region size of 8.5 megabytes should be sufficient on an XA or ESA system. For non-XA systems, MAXTASKS=15 is not possible because the region size required exceeds 16 megabytes. For non-XA systems, the default value of 4 is probably the highest value that can be specified if the maximum region size available is used.

The default is 4.

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## 26.03 CONTINUED . . .

<b>MSGLEVEL=</b> <b>MSGL</b>	<p>Specifies the lowest level message type to be displayed on the subtask print file which has the ddname REORGPRT.</p> <p><b>I</b> – Informational, warning, and error messages will be displayed.  <b>W</b> – Warning and error messages will be displayed  <b>E</b> – Only error messages will be displayed.</p> <p>The default is I.</p>
<b>MSGTIMESTAMP=</b> <b>MSGT</b>	<p>Specifies whether messages written to REORGPRT will be suffixed with the current date, time, and the internal subtask id that issued the message. If YES is requested or defaulted, the LRECL of the REORGPRT file is increased to 151.</p> <p><b>YES</b> – Messages will be timestamped.  <b>NO</b> – Messages will not be timestamped.</p> <p>The default is YES.</p>
<b>NOUPDATES=</b> <b>NOUP</b>	<p>Specifies the default action to take for IAM or VSAM data sets selected for reorganization that have had no adds, no deletes and no updates.</p> <p><b>YES</b> – The data set will be reorganized.  <b>NO</b> – The data set will not be reorganized.</p> <p>The default is NO.</p>
<b>OFULL=</b> <b>OF</b>	<p>Defines the default minimum percentage of independent overflow used in an IAM file.</p> <p>The default is 80.</p>
<b>OVERFLOWINDEX=</b>	<p>Specifies the default minimum amount of memory in bytes required for the in storage IAM overflow index.</p> <p>The default is 1048576 (1 megabyte).</p>
<b>OWNERSTRING=</b> <b>OWN</b>	<p>Specifies a string of up to four characters which will be used as an eye catcher in the ownerid of the data component of a VSAM KSDS. REORG will update the ownerid field of the data component's catalog entry to record information used to insure dataset integrity and to identify datasets that were being processed by REORG when either a system failure occurred, or REORG was canceled or otherwise terminated. See the RECOVER command for additional information.</p> <p>The default is FDR\$.</p>
<b>PCTTRECO=</b>	<p>Defines the default minimum percentage of total records in an IAM file that are in the IAM independent overflow area.</p> <p>The default is 10.</p>
<b>PDSFULL=</b> <b>PDSF</b>	<p>Defines the default minimum percentage of allocated space used by a PDS.</p> <p>The default is 90.</p>
<b>PDSEXTENTS=</b> <b>PDSEX</b>	<p>Defines the default minimum number of extents for a PDS.</p> <p>The default is 17.</p>
<b>PEFULL=</b> <b>PEF</b>	<p>Defines the default minimum percentage of prime extension used in a IAM file.</p> <p>The default is 100.</p>

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## 26.03 CONTINUED . . .

<b>PEUDATAR= PEUD</b>	<p>Defines the default minimum ratio times 100 of used prime extension blocks to prime data blocks in an IAM file.</p> <p>The default is 100.</p>
<b>POOLDASD=</b>	<p>Specifies if POOLDASD from Empact Software is installed, and unit names which have not been defined to the system are being used by POOLDASD to control volume allocation.</p> <p><b>YES</b> – Accept undefined unit names.  <b>NO</b> – Do not accept undefined unit names.</p> <p>The default is NO.</p>
<b>RECORDCOUNTS=</b>	<p>Specifies if FDRREORG should issue a message containing the number of records read and the number of records loaded after reorganizing IAM and VSAM data sets.</p> <p><b>YES</b> – Issue FDRREORG message FDRS55 which contains the record counts.  <b>NO</b> – Do not issue the FDRS55 message.</p> <p>The default is NO.</p>
<b>SELTERR=</b>	<p>Specifies if FDRREORG should set a return code of 8 if no datasets are selected by REORG or SIMULATE. Due to the nature of the selection process and the selection criteria specified, this may be a natural occurrence.</p> <p><b>YES</b> – Set return code 8 if no datasets are selected  <b>NO</b> – Do not set return code 8 if no datasets are selected.</p> <p>The default is YES.</p>
<b>SORTRPT=</b>	<p>Specifies the default sorting option for the report written to REORGRPT. Specifying YES requires that information related to each data set processed or selected be kept in storage until the function is completed. Because this might require a significant amount of virtual storage, this option is only supported for MVS/XA or MVS/ESA systems.</p> <p><b>YES</b> – Report is produced at the end of a REORG, SIMULATE or RECOVER function in data set name and volser order.  <b>NO</b> – Report is produced as data sets are processed or selected.</p> <p>The default is NO.</p>
<b>SUBTASKABEND= SUBTASKA</b>	<p>Specifies the action to take if a volume processor subtask abends.</p> <p><b>CONT</b> – Continue processing without the subtask.  <b>TERM</b> – Quiesce all active work and terminate.</p> <p>The default is CONT.</p>
<b>UPDATEDPDS=</b>	<p>Specifies the default action to take for partitioned data sets that do not have a current backup. If the update indicator is on in a data sets format 1 DSCB, the data set is considered to not have a current backup.</p> <p><b>YES</b> – The data set will be compressed.  <b>NO</b> – The data set will not be compressed.</p> <p>The default is YES.</p>
<b>VSAMDEFINE= VSAMDEF</b>	<p>Specifies the default option for deleting and defining VSAM KSDS's that will be reorganized.</p> <p><b>ALWAYS</b> – VSAM KSDS's are always deleted and defined before reloading.  <b>IFREQ</b> – Only VSAM KSDS's that cannot be reused will be deleted and defined before reloading.  <b>NO</b> – Disables delete and define of all VSAM KSDS's. KSDS's that cannot be reused will not be reorganized.</p> <p>The default is IFREQ.</p>

**26.04 FDRREORG JCL EXAMPLES****EXAMPLE 1** Display the current FDRREORG options.

```
//PRI NT      EXEC  PGM=FDRREOZO
//SYSPRI NT   DD    SYSOUT=*
//SYSLI B     DD    DSN=fdrreorg. l i brary, DI SP=SHR
//SYSI N      DD    *
PRI NT
```

**EXAMPLE 2** Display the current FDRREORG NOREORG list.

```
//PRI NT      EXEC  PGM=FDRREOZO
//SYSPRI NT   DD    SYSOUT=*
//SYSLI B     DD    DSN=fdrreorg. l i brary, DI SP=SHR
//SYSI N      DD    *
PRI NT NOREORG
```

**EXAMPLE 3** Change the checkpoint and log file high level qualifier to the RACF user id of the submitter.

```
//ZAP          EXEC  PGM=FDRREOZO
//SYSPRI NT    DD    SYSOUT=*
//SYSLI B      DD    DSN=fdrreorg. l i brary, DI SP=SHR
//SYSI N       DD    *
ZAP CKPTPREFI X=&RACFUI D,
LOGPREFI X=&RACFUI D
```

**EXAMPLE 4** Disable the default selection criteria for all dataset types.

```
//ZAP          EXEC  PGM=FDRREOZO
//SYSPRI NT    DD    SYSOUT=*
//SYSLI B      DD    DSN=fdrreorg. l i brary, DI SP=SHR
//SYSI N       DD    *
ZAP CASPLI TR=0, CI SPLI TR=0, FREESPACE=100,
OFULL=0, PCTTRECO=0, PEFULL=100, PEUDATAR=100,
PDSFULL=0, PDSEXTENTS=1
```

**EXAMPLE 5** Add SYS2 datasets to the NOREORG list.

```
//NOREORG      EXEC  PGM=FDRREOZO
//SYSPRI NT    DD    SYSOUT=*
//SYSLI B      DD    DSN=fdrreorg. l i brary, DI SP=SHR
//SYSI N       DD    *
NOREORG DSN=SYS2. **
```

**EXAMPLE 6** Add all IPLxxx and CATxxx volumes to the NOREORG list.

```
//NOREORG      EXEC  PGM=FDRREOZO
//SYSPRI NT    DD    SYSOUT=*
//SYSLI B      DD    DSN=fdrreorg. l i brary, DI SP=SHR
//SYSI N       DD    *
NOREORG VOL=(I PL*, CAT*)
```

CONTINUED . . .

**26.04 CONTINUED . . .**

**EXAMPLE 7** Add SYS3 datasets on volume SYSVOL to the NOREORG list.

```
//NOREORG      EXEC  PGM=FDRREOZO
//SYSPRI NT    DD    SYSOUT=*
//SYSLI B      DD    DSN=fdrreorg. l i brary, DI SP=SHR
//SYSI N       DD    *
                NOREORG DSN=SYS3. *, VOL=SYSVOL
```

**EXAMPLE 8** Reset the FDRREORG options to the distribution settings.

```
//RESET        EXEC  PGM=FDRREOZO
//SYSPRI NT    DD    SYSOUT=*
//SYSLI B      DD    DSN=fdrreorg. l i brary, DI SP=SHR
//SYSI N       DD    *
                RESET
```

**EXAMPLE 9** Remove all user modifiable entries from the NOREORG list.

```
//RESET        EXEC  PGM=FDRREOZO
//SYSPRI NT    DD    SYSOUT=*
//SYSLI B      DD    DSN=fdrreorg. l i brary, DI SP=SHR
//SYSI N       DD    *
                RESET NOREORG
```

# SAR

STAND ALONE RESTORE

USER DOCUMENTATION

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**30.01 SAR TECHNICAL DESCRIPTION****SAR  
OVERVIEW**

SAR is the Stand Alone portion of the FDR DASD Management System. SAR is a self-loading, stand-alone program not requiring an operating system.

SAR enables you to BACKUP or RESTORE a disk volume when, due to the unavailability of an operating system, FDR cannot be run. SAR is simple to use and provides console messages to prompt you. Diagnostic messages are issued if SAR encounters difficulty during the BACKUP or RESTORE. SAR will execute on all 370, 30xx, 43xx and ES/9000 CPUs. In addition, SAR will automatically determine the model that the CPU is operating in (370, XA, or ESA). SAR operates in an LPAR under PR/SM or the OEM equivalents) or on a VM virtual machine.

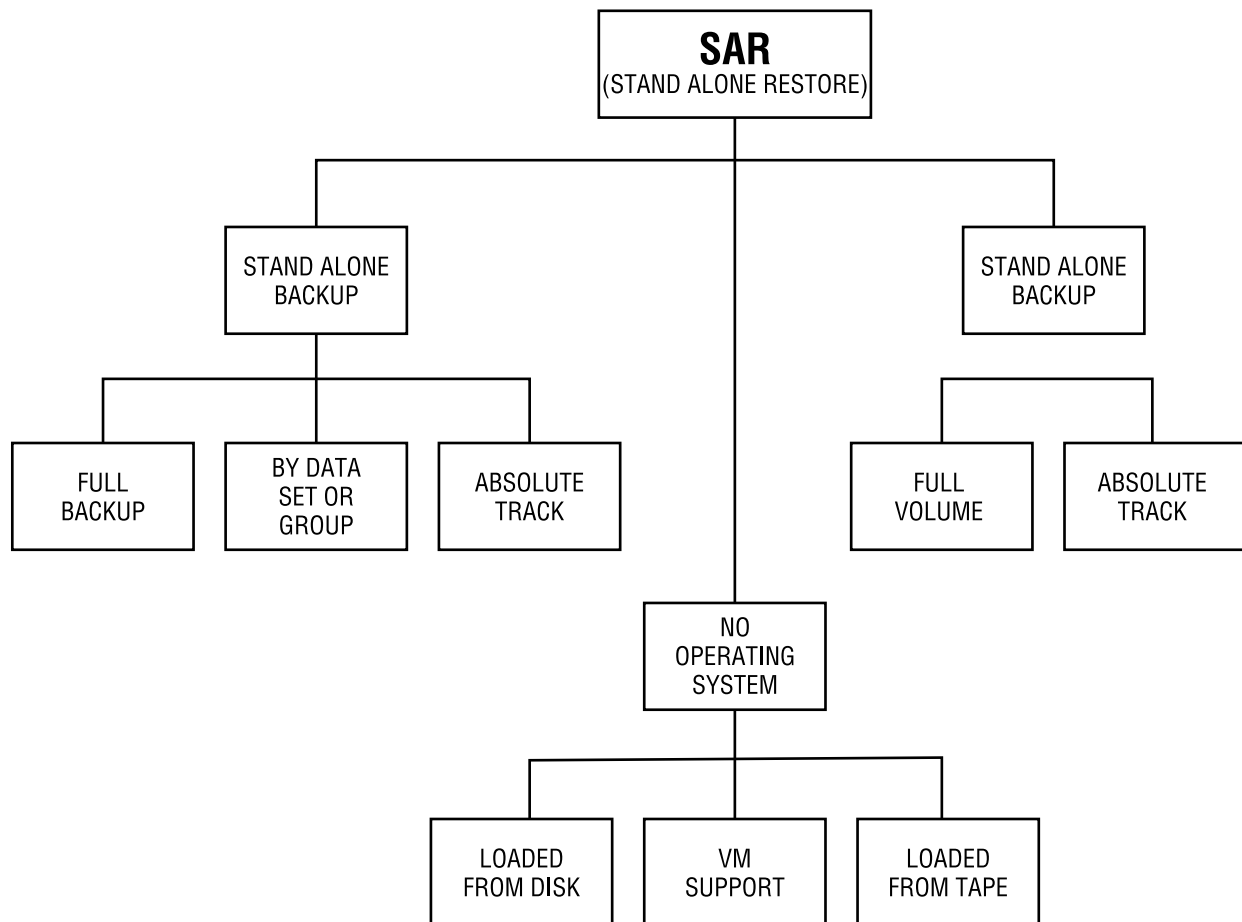
**CAPABILITIES** SAR supports three major operations:

**RESTORE** – A disk volume from a backup tape.

**DUMP** – A disk volume or data sets to tape.

**CLIP** – A disk volume to a new volume serial.

NOTE: SAR cannot copy directly from one disk to another, but you can use SAR to DUMP one disk to tape and RESTORE it to another.

**SAR  
FLOWCHART**

CONTINUED . . .

**30.01 CONTINUED . . .****SAR  
RESTORE  
OPERATIONS**

SAR can restore:

- An entire disk volume from a full-volume backup tape created by FDR, CPK, ABR, or SAR.
- Ranges of specific tracks, from any type of backup tape created by FDR, CPK, DSF, ABR, or SAR.

During RESTORE, SAR uses the alternate track assignments of the receiving disk volume. If the input tape to a SAR RESTORE is not a full-volume backup tape, SAR issues a warning message and you have the option to continue the restore.

On a RESTORE of an entire disk volume, there are three options for setting the volume serial number: it may be retained from the output volume, restored from the backup tape, or set to a new value supplied at run time. These options are controlled through the reply to the VOLUME SERIAL console message.

**SAR  
BACKUP  
OPERATIONS**

SAR can back up to tape:

- An entire disk volume. The backup will contain all allocated tracks shown in the VTOC, including the VTOC and cylinder zero head zero, and will be similar to a full-volume backup created by FDR.
- Data sets, by dsname or group name. The backup will be similar to a backup created by DSF with DSN= and/or DSG=.
- Ranges of specific tracks. The backup will be similar to a backup created by DSF with FROM/TO.

SAR backup supports 3350, 3380, 3390 and 9340 disks. SAR will request scratch tapes to be used for the backup. Both standard labeled and non-labeled tapes may be used. SAR will display the data set name, volume serial number and expiration date of the backup tape used. You can specify the data set name to be placed on the tape. The backups produced by SAR can be restored by SAR, FDR, CPK or ABR. Individual data sets can also be restored from this backup using FDRDSF or FDRABR. However, VSAM files cannot be restored by cluster name.

NOTE: Tapes created by SAR cannot be compared to tapes created with FDR or FDRABR.

**CLIP  
OPERATIONS**

You can specify that SAR is to change the volume serial number of a disk volume. SAR will prompt you for the existing serial number and the new serial number. This procedure will not affect any other data on the volume. However, if the volume serial is changed on a volume containing ICF VSAM clusters or SMS-managed data sets, that data will not be accessible.

**ABSOLUTE  
TRACK  
OPERATIONS**

You can specify that SAR is to DUMP or RESTORE specific tracks. From 1 to 10 ranges of tracks may be specified. Specify ABSTRK on the TYPE option.

SAR will prompt you for the range of ADDRESSES to be processed. Specify \*\*\*  
END when all the absolute track addresses have been entered.

Absolute track restore does not update the DSCBs in the VTOC. Care should be taken if the label or a track in the VTOC is to be restored.

**DATA SET  
OPERATIONS**

You can specify that SAR is to DUMP specific data sets or groups of data sets. Specify DATASET on the TYPE option. SAR will prompt you for the data set names. From 1 to 10 data sets or groups may be specified. A group name is identified by inserting an \* after the group name. For example, specifying SYS1. \* will instruct SAR to dump all data sets starting with 'SYS1.'. Specify \*\*\*END when all of the data set names have been specified. If the VTOC is to be dumped, specify \*\*\*  
VTOC. This will also dump cylinder zero head zero (the volume label track).

NOTE: SAR RESTORE does not support data set operations.

CONTINUED . . .



**30.01 CONTINUED . . .**

**ALTERNATE  
DEVICE  
SUPPORT** SAR will automatically determine the type of disk being dumped or restored. SAR is able to restore backups created from a smaller density device to a larger density device with the same track capacity (ex: 3380 single density to 3380-1, 3380-E, 3380-2, or 3380-K; 3390-2 to 3390-3). SAR will automatically recognize whether the volume being restored to is the same device type (density) as the volume that was backed up. If the volume being restored to is larger, SAR will turn on the DOS bit, so that the first time a data set is allocated on that volume after the system is IPLed, the system will call the VTOC conversion routine, which will rebuild the VTOC to reflect the larger amount of available space. If the volume contained an indexed VTOC, you must use ICKDSF to rebuild the index.

In addition, SAR can also be used to restore a higher density device to a lower density device with the same track capacity, provided that no datasets are allocated beyond the end of the smaller device:

- Specify OPERATION REQUEST=RESTORE.
- To restore to a smaller density, you must override the device type that SAR has correctly determined and substitute the type that was backed up. For example, if your backup was created from a 3380-K and you want to restore to a 3380-E, then specify OUTPUT DISK DEVICE=3380-K.
- After the system is IPLed, you must SUPERZAP the format 4 DSCB in the VTOC to turn on the DOS bit and to fill in the correct device size. Then allocate a new data set, and the system will recalculate the free space.

Warning: This procedure will only work if all of the allocated tracks are contained within the physical capacity of the output disk. Otherwise, SAR will give various error messages.

SAR cannot restore from a 3380 to a 3390 in native mode, or vice versa. A 3390 in 3380 compatibility mode may be restored to a 3380 if no data sets are allocated beyond the end of the 3380. Note: a 3380-1 has 1113 cylinders, while a 3380 single density has 885 cylinders; likewise a 3380-2 has 2226 cylinders while a 3380 double density has 1770 cylinders.

**CONSOLE  
SUPPORT** Printer/Keyboard and display consoles are supported by SAR. All 3270-Family display consoles are supported, as long as they are connected to a channel-attached NON-SNA 3x74 common unit or integrated console adaptor. Any terminal usable as an operating system console can be used for SAR.

**VM  
SUPPORT** SAR can be IPLed on a VM virtual machine. The VM terminal is used as the SAR console (usually in Printer/Keyboard mode).

Since the SAR program can be reformatted as an IPL-able “cards deck” ([See Section 30.20 for instructions](#)), it is possible to place SAR on a CMS file, “Punch” that file to the Virtual card reader of a Virtual machine, and IPL from that card reader. The SAR console overrides option, explained later in this section, can be used to minimize or eliminate SAR operator replies.

**BACKUP** – SAR can back up full physical volumes, OS formatted minidisks, or CMS formatted minidisks. A minidisk to be backed up can be allocated to all or part of the disk volume. If multiple minidisks exist on the physical volume, SAR will only back up the one connected to SAR. For CMS formatted minidisks, if the minidisk does not occupy an entire physical volume, you must request the absolute track function with a range of tracks corresponding to the size of the minidisk. Ex: If a CMS minidisk occupies 50 cylinders on a 3380, specify STARTING CCHH=EL00000000 and ENDING CCHH=EL00490014. The physical location of the minidisk on the real volume does not matter.

**RESTORE** – SAR can restore full physical volumes, OS formatted minidisks, or CMS formatted minidisks. On OS formatted volumes, SAR will search for the OS VTOC. If found, SAR will retain the alternate track information contained in the VTOC. SAR RESTORE does not use the write record zero command, and does not read the alternate tracks.

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**30.01 CONTINUED . . .**

NOTE: In order to use SAR to back up or restore an entire physical volume that contains multiple minidisks, the VM directory must define a minidisk that extends over the whole physical volume (although it is not necessary to include the alternate tracks), or you must dedicate or ATTACH the physical volume to the virtual machine in which SAR is running. In addition, on DUMP operations, if the first minidisk on the volume is in OS format, you must request the absolute track function and must specify that the whole volume is to be dumped.

If you need to simulate the Hardware INTERRUPT function, use the VM command "#CP EXT".

If RESTART is to be simulated, use the VM command "#CP SYSTEM RESTART".

The use of these functions is explained later in this chapter.

There are no special considerations for using 3480 cartridge drives under VM.

**ABR NOTES** If you restore an ABR created backup tape using SAR, the ABR model DSCB on the volume will be downleveled. The Generation and Cycle will reflect the previous generation. Use the REMODEL command ([See Section 55.05](#)) to update the ABR model.

SAR can restore from any file on an ABR backup tape, using the file sequence number on the INPUT TAPE UNIT command. The file sequence number is shown in the FDRABRP PRINT CATLG report, and in the FDR305 message in the listing of the backup job.

**TAPE SUPPORT** SAR supports 3420 reel-type tape drives, and also the 3480, 3490 and 3490E tape cartridge sub-systems. If the 3480/3490 is used, SAR will ASSIGN the tape drive to this system.

Automatic cartridge loaders (ACLs) are supported only in manual mode.

It is the operator's responsibility to ensure that the required tapes are mounted in the correct order

SAR RESTORE automatically supports tapes that were compressed by the data compression feature of FDR (COMPRESS=EL). There are no special considerations.

SAR RESTORE also automatically supports tapes that were compacted by the 3480/3490 hardware using the Improved Data Recording Capability (IDRC). For a compacted tape, specify INPUT TAPE DEVICE=3480, and specify INPUT TAPE UNIT= a tape drive that supports compression, and the restore will proceed normally. If the tape drive does not support compression, SAR will give an error message and terminate; you must restart SAR and point to an INPUT TAPE UNIT that supports compression. If INPUT TAPE DEVICE=348X is specified on a RESTORE, it is treated the same as 3480.

SAR BACKUP can create compressed backup tapes using the 3480/3490 hardware IDRC feature. To create a compressed backup tape, you must specify OUTPUT TAPE DEVICE=348X.

If 348X is specified and the tape drive supports compression, the backup tape will be created in compressed format. If 348X is specified and the tape drive does not support compression, the backup will be created in uncompressed format, and no error message will be issued.

If OUTPUT TAPE DEVICE=EL3480 or 3490 is specified, then the backup will be created in uncompressed format, whether or not the drive supports compression.

**MULTI-VOLUME TAPE** On RESTORE, SAR will automatically request the second and subsequent tape reels if more than one volume was used on the backup. On backup, SAR will request a new scratch tape to be mounted if the current reel is full. A message will be issued to the console requesting the next volume. Once the operator mounts the next tape, SAR will continue with the operation. SAR will rewind and unload the tape at the end of the operation.

**MULTIPLE TAPE UNITS** SAR can use 1 or 2 tape drives for the Dump or Restore operation. To request 2 tape drives, specify "2" after the TAPE DEVICE parameter (ex: INPUT TAPE DEVICE=3480,2). Allowing SAR to use 2 tape drives will reduce wall clock time, by making it possible for the operator to premount the next tape. SAR will automatically start writing or reading the next tape while the prior one is being rewound and unloaded.

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**30.01 CONTINUED . . .****CONSOLE  
OVERRIDES**

When SAR is IPL'ed, a menu is displayed with all of the operator options. Ordinarily, the operator can change any of the default values displayed, or can depress Enter to use the default. However, there are two special options available:

- 1) Allow no operator responses at all
- 2) Allow no operator responses on individual messages.

If OVERRIDE=N is specified on the HRDCOPY DEVICE parameter (using FDRSARLR), SAR will use all the defaults specified via FDRSARLR, without the operator depressing Enter. However, if an option is invalid, SAR will prompt the operator for the proper response. If all options are valid, SAR will immediately start the specified operation.

Warning: If a value specified is supported by SAR but is not what you want, you will not get an opportunity to change it. You must have a copy of SAR without OVERRIDE=N.

Example: TAPE DEVICE=3420 and you no longer have 3420 tapes.

The second option is to suppress the operator response for individual options. When an option is specified by FDRSARLR and a hyphen (-) is coded instead of an equal sign, SAR will no longer prompt the operator for this option (ex: OPERATION REQUEST-RESTORE). However, unless OVERRIDE=N is specified, SAR will always prompt the operator for the first option (HRDCOPY DEVICE=). The reason for this is to give the operator the ability to override the hard coded options. If the operator changes OVERRIDE=Y to OVERRIDE=C, SAR will allow any of the options to be changed, even the hard coded ones.

**ERROR  
RECOVERY**

SAR contains the ability to continue after certain types of errors. If an error occurs, SAR will display a message detailing the error. If SAR is able to continue, the message will display 'DEPRESS INTERRUPT OR RESTART'. INTERRUPT and RESTART are Hardware functions on your CPU which must be invoked from your Hardware (Service) console; see [Section 30.03](#) for details. If INTERRUPT is entered, SAR will continue with the next track or block of data. If RESTART is entered, SAR will print a storage dump on the hardcopy device (if available) prior to continuing.

**30.02 SAR PROCESSING OPTION PROCEDURES AND REQUIREMENTS****PROCESSING  
OPTION  
PROCEDURES**

If a printer/keyboard non-display console is used, a list of processing option defaults is printed upon completion of a SAR IPL. Then the option messages are repeated one at a time, followed by an equal sign. The default value may be accepted by depressing EOB/RETURN. A default is overridden by entering an appropriate alternative, then depressing EOB/RETURN. SAR will then print the next option.

When display consoles are used, the processing options and their defaults are provided on the screen and the cursor is positioned to allow modifications. A default value may be accepted by depressing ENTER; the cursor will then be positioned to the next option. A modification, if necessary, should be made before the ENTER key depressed. If the modification is not accepted, a message will be issued and the cursor will be repositioned on the invalid entry. If the modification is accepted, the cursor will be positioned to the next entry.

SAR is not a true full-screen processor.

**It is always necessary to press ENTER once for each option, whether or not the defaults are accepted.**

**REQUIRE-  
MENTS**

The hardware devices to be used by SAR are the IPL device, operator console, hardcopy device, a tape drive and disk volume. All must be on-line to the CPU, enabled and ready. If no hardcopy device is available, SAR can run without one, but if problems occur, diagnosis may be more difficult.

NOTE: If SAR is IPLed on a multi-processor CPU, SAR will actually execute only on the processor it was IPLed on, so all of the devices required by SAR must be accessible from that processor.

SAR accepts as the operator console the first device that presents an attention interrupt unless the console device has been specified using the FDRSARLR program ([Section 30.20](#)). Normally, you do this by simply pressing ENTER or REQ on the desired console.

If there are Local or Remote terminals on the system, or HYDRA controllers, the controllers should be MACHINE RESET and disabled. If this is not done, a terminal rather than the system console may receive the SAR messages. Any channel-to-channel adapters (CTCs) attached to the SAR CPU should also be disable. Resetting these controllers and adapters is not necessary if the CONSOLE UNIT was specified using FDRSARLR.

The SAR program should be copied from the installation tape, using the program FDRSARLR ([Section 30.20](#)). However, IEBGENER can also be used to copy the SAR program file to a nonlabeled tape.

SAR can be loaded from a tape, disk or card deck. The SAR program comes with built-in defaults for all of the processing options; you can tailor the defaults to match your environment via control statements supplied to the SAR loader program ([FDRSARLR, Section 30.22](#)).

**30.03 INITIAL SAR PROGRAM LOAD**

**SAR IPL** To IPL SAR, one of the following procedures must be followed:

**STEP 1** From Tape – Mount and ready the SAR IPL tape on an available tape drive. Rewind it if necessary.

From Disk – Device must be on-line and ready

From Cards – Place the SAR IPL deck in the card reader, ready the device and press END-OF-FILE on the card reader.

**STEP 2** IPL SAR from the selected device. The procedure will vary depending on the type of your CPU, but the procedure will be similar to the procedure you use to IPL your normal operating system, except that the IPL device address will be the device selected in Step 1. Note that a SYSTEM RESET is not required before IPLing (IPL does an automatic SYSTEM RESET) and that either a IPL NORMAL or a IPL CLEAR may be used (NORMAL will be faster since it does not clear memory). It is also not necessary to change the operating mode of the CPU; SAR will automatically recognize and operate in 370, XA or ESA mode.

If you are not familiar with the IPL procedure for your CPU, details can be found in the operator's documentation from the hardware vendor. However, for quick reference, here are brief descriptions for common IBM CPUs:

**4381:**

- These have a common hardware/software console. If necessary, press MODE SEL to switch to the hardware functions.
- Enter L to switch to the LOAD screen.
- Enter Uxxx to set the LOAD address to the SAR IPL device
- If you have a 2-processor model, enter S0 to select PU0
- Enter N to do a normal IPL
- If the IPL is successful, the console will automatically switch to software mode and can be used as the SAR console.

**308x, 3090, ES/9000:**

- All of these have a separate service (hardware) console, from which the IPL is performed
- If operating with PR/SM, select the LPAR (Logical partition) on which you wish to IPL SAR. SAR will only be able to access devices configured to this LPAR.
- If necessary, enter F OPRCTL to select the Operator Control screen.
- Enter L1, then enter the address of the SAR IPL device
- If your CPU or LPAR has multiple processors, you may need to enter Tn to select processor “n”. Since SAR operates only one processor, all devices required must be accessible from the target processor (this is usually not a problem in XA or ESA mode).
- Enter either O4 or O7 (letter “oh”) to do a IPL NORMAL or IPL CLEAR respectively; either will work. When the IPL is successful, you must move to a software console to operate SAR.
- Alternately, you may enter the Service Language command (from any screen):

LOAD CPn address

where “CPn” is the target processor n, and “address” is the device address of the SAR IPL device.

**NOTE:** If SAR is being IPLed from an INNOVATION FDR distribution tape, you must perform the IPL procedure 5 times. The first 4 IPLs will fail as it reads the header labels (VOL1, HDR1, HDR2, and tape mark); the fifth IPL should succeed (allow a few seconds after each error to be sure the processor has completed the IPL procedure before initiating the next one).

CONTINUED . . .

**30.03 CONTINUED . . .**

- STEP 3** If the CONSOLE UNIT was specified via FDRSARLR (Section 30.22), the operator messages will automatically appear on the unit specified, if it is available.

--OR ELSE--

When the IPL successfully completes, the system should enter a wait state with a code of X'FFFF' in the last two bytes of the PSW. At this time you can select the SAR console by pressing the ENTER key on a display console, or pressing the REQUEST key on a printer-keyboard console.

- STEP 4** Messages providing the SAR processing default options will now appear on the operator console device.

On a display console, enter one response at a time, depressing the ENTER/END key. If the response is valid, SAR will position the cursor to the next response. SAR will display a line of valid responses for all the messages other than the unit address requests.

The process option messages are detailed in the next section.

NOTE: SAR does not operate in full screen mode. Also the ERASE EOF key is not supported.

If the remainder of a line is to be blanked out, it must be done using the space bar.

**IT IS ALWAYS NECESSARY TO PRESS ENTER ONCE FOR EACH OPTION THAT THE CURSOR POSITIONS TO, WHETHER OR NOT THE DEFAULTS ARE ACCEPTED.**

If OVERRIDE=N appears on the first option line, the cursor will not stop on any option lines, and pressing Enter will be ignored. If OVERRIDE=Y appears on the first line, the cursor will stop on option lines that have equal signs (=), but not on option lines that have hyphens (-). If you change the first line from OVERRIDE=Y to OVERRIDE=C, then the cursor will stop on every options line, even if it has a hyphen.

- STEP 5** All devices needed for this execution should be available and ready. You may pre-mount Input or Output Tape volumes if you like, or SAR will prompt you to mount them.

- STEP 6** The DUMP, RESTORE or CLIP will begin when all of the processing options have been specified. Successful conclusion of the DUMP/RESTORE process will be indicated by an 'FDR999 SAR SUCCESSFULLY COMPLETED' message. Other conditions are indicated by appropriate messages to the operator console and hardcopy device.

**PROBLEM  
DETER-  
MINATION**

- a. If SAR does not successfully load, restart with Step 1.
- b. A Runaway backup tape may be caused by an incorrect response to the INPUT TAPE UNIT=EL message.

CONTINUED . . .

**30.03 CONTINUED . . .****RESTARTING  
SAR**

Once a SAR function completes, either normally or abnormally, you may restart SAR to initiate a new function without re-IPLing. You will receive message:

FDR938 USE PSW OR ENTER ON CONSOLE TO RESTART

In most cases, simply press ENTER on the SAR console to restart SAR; if that is not possible, use the PSW RESTART function (described below).

SAR will completely reinitialize itself and will redisplay the initial SAR menu. It will not retain any options you specified for the previous function (except for the console address); start over from step 4 to initiate the new SAR function.

**INTERRUPT**

SAR may ask you to use the INTERRUPT key to continue after certain errors. This will be a key on the hardware (service) console which sends an external interrupt to the CPU. On 4381 consoles, this is a red key labeled INTR. On 308x, 3090 and ES/9000 service consoles the key has IRPT on the front of the key (you must hold down the ALT key when you press IRPT); you may also use the Service Language command: IRPT Cpn

If your CPU or LPAR has multiple processors, you must direct this INTERRUPT function to the processor that SAR is running on (the one it was IPLed on); this is called the "target processor", and is usually indicated in the display line near the bottom of the service console screen. If the target is not set properly, you can change with the Tn command on the appropriate screen on your system.

**PSW  
RESTART**

The PSW RESTART hardware function (also called RESTART on many processors) is used for several things in SAR. On 4381 systems, you must press CNG DISP (change display) on the console to select the hardware menu, then type RESTART. On 308x, 3090 and ES/9000 service consoles there is a key labeled RSTRT on the front (use with the ALT key) or a Service Language command: RESTART Cpn

Like INTERRUPT, on a multi-processor, you must direct the RESTART to the processor SAR is executing on.

If SAR has asked you to use INTERRUPT or RESTART to continue after an error, RESTART will operate just like INTERRUPT, except that if you have assigned a hardcopy device to SAR, SAR will print a memory dump on the hardcopy first.

If you specified the COREDUMP=Y option for SAR (on the same line where you specify the disk volume serial), and a hardcopy device was assigned, then RESTART will cause SAR to print a memory dump on the hardcopy, and then continue with normal operation.

Once SAR has terminated, RESTART can also be used to reinitialize SAR for a new function, as described above.

**STOP/  
START**

You may need to use the STOP and START hardware functions, especially if you need to view the SAR PSW for error determination. These will also be keys on the service console, and Service Language commands on systems that support them.

On systems with multiple processors, you must be sure to START only the processor that SAR is executing on, otherwise SAR will probably abnormally terminate. On 4381s, SHIFT-START will start only the target CPU. On 308x, 3090 and ES/9000 you MUST use the Service Language command: START Cpx

## 30.04 SAR CONSOLE MESSAGES

PROCESSING  
OPTION  
CONSOLE  
MESSAGES**a. HRDCOPY DEVICE = mmmm | NONE |,  
OVERRIDE = Y | C | N**

Specifies the type of hardcopy console or printer for SAR messages and core dumps.

**DEVICE TYPE****SAR RESPONSE**

Printer/keyboard console

3210 or 3215

Line printer

1403, 3203, 3211 or 4245

3270 Family printer

3286, 3287, 3288 or 3289

Tape

TAPE or 3480

NOTES: "Line printer" includes 3262 models 1, 5, and 11; 4245 models 1, 12, and 20; 4248; and any other printer that responds to line printer commands. Any line printer may be specified as "1403" or any other value shown above.

"3270-family printer" includes 3262 models 3 and 13; 3268; 4214; 4224; 4234; 4245 models D12 and D20; 5210; and any other printer that responds to 3270-family printer commands. Any CRT printer may be specified as "3287".

Note that although you can reply "4245" to indicate a line printer, this reply is not valid for 4245 models D12 or D20; these models act as 3270-family printers, and the correct reply for these models is "3287".

A display console may not be used for the hardcopy.

The 3800 printer is not supported.

If a hardcopy device is not available, reply 'NONE' to this message. The cursor will be positioned to the OPERATION REQUEST line.

TAPE NOTE: If a tape is specified for the hardcopy device, SAR will write all messages to the tape drive specified. SAR will perform label processing on the tape. Both SL and NL tapes can be used. If the tape is SL, SAR will display the data set name and expiration date of the tape mounted.

You will be asked if it is OK to use the tape and given an opportunity to specify a new data set name. Care should be taken not to specify the FDR backup tape as hardcopy. SAR writes unblocked 120 byte records to the tape. IEBGENER, or any other print program can be used to print the tape with RECFM=F,BLKSIZE=120.

**OVERRIDE=** – Specifies whether the operator will be permitted to override the options that were set by FDRSARLR.

**Y** – Specifies that the operator will be prompted for each option in which an equal sign appears. If a hyphen (-) has been specified for an option via the SAR loader program, SAR will process the FDRSARLR value for that option and bypass the prompt. The first message is always prompted to allow OVERRIDE= to be specified.

**C** – Specifies that the operator will be prompted for each of the options, even if they have been coded with a hyphen (-). This option should be used if the operator needs to change a hard coded option. This option can only be specified at execution time, and not by the SAR loader program (FDRSARLR).

**N** – Specifies that the operator will not be prompted for any of the options. This option can only be specified by the SAR loader program (FDRSARLR). The operator will still be prompted for any default which is invalid, such as a unit address that no longer exists.

Default is Y (yes).

**b. HRDCOPY UNIT=uuu**

The physical three digit hexadecimal address of the message device.

CONTINUED . . .



## 30.04 CONTINUED . . .

**c. OPERATION REQUEST = RESTORE | DUMP | CLIP**

Specifies the operation you wish SAR to execute.

**RESTORE** – Specifies that SAR is to restore an FDR backup tape to a disk volume.

**DUMP** – Specifies that SAR is to backup a disk volume or data sets to tape.

**CLIP** – Specifies that SAR is to change the volume serial of a disk volume. The cursor will be positioned to the OUTPUT DISK DEVICE message. You will be prompted for the new volume serial after the disk's current volume serial is entered and validated. A restore tape is not used and the disk volume is not changed in any other way.

NOTE: For compatibility with earlier releases, a reply of RESTVM will also be accepted, and will be treated as RESTORE. The reply of RESTORE is now compatible with VM. SAR RESTORE does not read the alternate tracks, and does not use the Write R0 command.

**d. TYPE = FULL | DATASET | ABSTRK**

Specifies the type of operation SAR is to execute.

**FULL** – On RESTORE, specifies that SAR is to restore all of the tracks contained on an FDR backup tape.

On DUMP, specifies that SAR is to dump to tape all of the allocated tracks on the disk volume. The VTOC and cylinder zero head zero will also be dumped.

**DATASET** – On RESTORE, not valid.

On DUMP, specifies that SAR is to prompt for the data set names or groups to be dumped. Only these data sets will be dumped. A maximum of ten (10) data set names or groups may be specified. A group name is specified by ending the characters with an \*, SAR will dump all data sets which match the characters specified.

EXAMPLE: DATA SET NAME=SYS1.\* will dump all data sets beginning with 'SYS1.'.

The VTOC and cylinder zero head zero may be dumped by specifying \*\*\*VTOC. When all of the data set names have been entered, enter \*\*\* END to process.

**ABSTRK** – Requests that specific tracks be dumped or restored. SAR will prompt you for the beginning address with the message STARTING CCHH=CCCCHHHH, and will position the cursor after the equal sign. Overtyping the CCCCHHHH with the four digit decimal cylinder number and head number, and hitting ENTER. Next SAR displays the message ENDING CCHH=CCCCHHHH, ENTER the decimal ending address, and hit ENTER. SAR then returns to the STARTING CCHH message, and you enter the next range of tracks. When all of the track ranges have been entered, enter \*\*\*END to process. A maximum of ten (10) ranges may be specified.

WARNING: Care should be taken if the volume label track or a track in the VTOC is to be restored. If cylinder zero, track zero is specified on a restore, the label will be restored from the dumped volume.

CONTINUED . . .

## 30.04 CONTINUED . . .

**e. INPUT | OUTPUT****TAPE DEVICE = tttt,n**

Specifies the type of device used for the backup tape.

**DEVICE TYPE****SAR RESPONSE (tttt)**

3420 Type tape drive	3420
3422 Type tape drive	3422
3430 Type tape drive	3430
3420/6250 BPI tape drive	6250
3480/3490 cartridge tape drive	3480
3490E cartridge tape drive	3490
3480/3490 cartridge tape drive - if hardware compaction desired on backup	348X

NOTE: On a DUMP operation, if 348X is specified, and the specified OUTPUT TAPE UNIT supports compaction using the 3480/3490 Improved Data Recording Capability (IDRC), then the backup tape will be created in compressed format. If 348X is specified and the tape drive does not support compaction, the backup will be created in uncompressed format, and no error message will be issued.

If OUTPUT TAPE DEVICE=3480 or 3490 is specified then the backup will be created in uncompressed format, whether or not the drive supports compaction.

On a RESTORE operation, if 348X is specified, it will be treated the same as 3480. If the input tape is in compressed format, and the specified INPUT TAPE UNIT supports compaction, the restore will proceed normally. If the tape drive does not support compaction, SAR will give an error message and terminate; you must restart SAR and point to an INPUT TAPE UNIT that supports compression.

Number of tape units (,n) – specifies the number of tape units, 1 or 2, for the dump or restore. If 2 is specified, SAR will ask that the next tape be mounted on the alternate drive once the current tape starts processing. The mount requests will flip-flop until the dump or restore is completed. SAR will process the first tape on the unit specified in the TAPE UNIT parameter. If “,2” is specified for TAPE DEVICE, a mount message will be issued for the next sequentially higher unit address (ex: for TAPE UNIT=391, the other unit will be 392). However, if the TAPE UNIT address ends with F, then the next lower address will be used (ex: for TAPE UNIT=38F, the other unit will be 38E). This parameter reduces wall clock time because it allows the operators to pre-mount the next tape without waiting for the rewind and unload of the current tape. f INPUT TAPE UNIT=uuu ,fff ,Nff ,NRW

**f. INPUT | OUTPUT****TAPE UNIT= uuu | ,fff | ,Nff | ,NRW**

UNIT=uuu

The physical three digit hexadecimal address of the tape device. If “,2” was specified for TAPE DEVICE, then uuu is the address of the first tape device, and the address of the other device will be 1 higher; except that if uuu ends with an F, then the address of the other device will be 1 lower.

DATA SET NUMBER (,fff) – Restore only

Used to identify the file number of the data set to be restored (Ex: 380,001).

If you specify 3 numeric digits, SAR checks for a standard label tape. If the tape is standard labeled, this value is the file sequence number in the header label. SAR will scan each label on the tape until this file number is found. ‘N’ must be specified if the tape is non-labeled and a file other than the first is to be restored. SAR will forward space the number of tape marks specified by ff minus one.

CONTINUED . . .

## 30.04 CONTINUED . . .

IF 'NRW' is specified, SAR will process the tape without rewinding it first. This option allows you to restart the tape restore if SAR was abnormally terminated on the previous execution.

NOTE: The first file on SL or NL tapes is automatically handled by the SAR default value of '001'. Improper specification of this value may result in a runaway tape. If you specify a file sequence number, you should specify all three characters. ABR full volume backup tapes are supported by SAR. You must specify the proper file sequence number if the file is not the first on the backup tape. The file sequence number is shown in the FDRABRP PRINT CATLG report, and in the FDR305 message in the listing of the backup job.

**WARNING: We strongly recommend that ABR users run regular PRINT CATLG reports because if your system is down you may have no other way of identifying the required input tapes.**

## g. MODE=mm

TRACK	DENSITY	SAR RESPONSE
18TK/36TK	38000 BPI (3480/3490/3490E)	D4
9TK	6250 BPI	D3
9TK	1600 BPI	C3

## h. INPUT | OUTPUT | DISK UNIT=uuu

The physical three digit hexadecimal address of the disk device.

## i. INPUT | OUTPUT | DISK DEVICE=dddddd

Specifies the type of disk SAR is to DUMP or RESTORE. Not all disk types are supported for DUMP ([See Section 30.01](#)). For most disks, SAR will automatically determine and display the actual type of the disk.

DEVICE TYPE	SAR RESPONSE
2305 model 2	2305-2
3330 model 1	3330
3330 model 11	3330-2 or 3330-1
3350	3350
3380 Single Density (885 cyl.)	3380
3380-E Double Density (1770 cyl.)	3380-E
3380-K Triple Density (2655 cyl.)	3380-K
3390-1 in 3380 Compatibility Mode (1113 cyl.)	3380-1
3390-2 in 3380 Compatibility Mode (2226 cyl.)	3380-2
3390-3 in 3380 Compatibility Mode (3339 cyl.)	3380-3
3390-1 in Native Mode, Single Density (1113 cyl.)	3390-1
3390-2 in Native Mode, Double Density (2226 cyl.)	3390-2
3390-3 in Native Mode, Triple Density (3339 cyl.)	3390-3
3390-9 (10017 cyl.)	3390-9
9340 (9345) Model 1 (1440 cyl)	9340-1
9340 (9345) Model 2 (2156 cyl)	9340-2

NOTE: See "Alternate Device Support" in [Section 30.01](#) for considerations when restoring to a compatible device with a different density.

CONTINUED . . .

## 30.04 CONTINUED . . .

j. **VOLUME SERIAL=vvvvvv | ,C PY = Y | N | C |**  
**,BUFNO=n | ,COREDUMP= Y | N**

vvvvvv is the volume serial number of the pack being restored, dumped or clipped. SAR will check to be sure that the correct volume is mounted. **If the pack does not contain a valid label or if the volume is brand new, type in six (6) blanks and SAR will bypass the label check.** SAR will issue an error message when it cannot read the volume label; if you blank out the volume serial, or if it was already blank, and you depress Enter, the operation will proceed.

**CPY =** – Specifies the label option. Not valid on DUMP.

**Y** – Indicates that the restored pack will receive the volume serial of the dumped pack.

If the vvvvvv field is blank, Y is assumed even if N is specified.

**N** – Indicates that the volume serial of the receiving pack is to be retained.

**C** – Indicates that SAR is to change the volume serial of the volume being restored to a user-specified value. SAR will prompt you for the new volume serial after the disk volume is validated for the current volume serial.

**BUFNO = n** – Specifies the number of buffers SAR is to use for the dump or restore. BUFNO=1 specifies one buffer, BUFNO=2 specifies two (2) buffers.

With 2 buffers SAR overlaps disk and tape I/ O, so 2 is recommended.

Default is two buffers.

**COREDUMP =** – Specifies the coredump option.

**Y** – Storage dumps will be produced if PSW RESTART is used and a hardcopy is available.

**N** – No storage dump will be produced if PSW RESTART is used.

Default is Y (yes).

**ENDING  
MESSAGES**

The SAR operation will begin after all of the above messages are satisfied. On a DUMP operation, SAR will display additional messages for the data set name and use of the scratch tapes. Successful completion is indicated by the FDR999 message on the hardcopy device and the operator console. The number of tracks processed is also displayed. SAR can be restarted using PSW RESTART.

**30.20 STAND-ALONE LOADER UTILITY PROCESSING**

The Stand-Alone loader utility (FDRSARLR) will construct a SAR program that is used at IPL time. This Stand-Alone program can be written to disk or to unlabeled or standard labeled tape. The loader can also create a loadable deck format that can be punched to cards.

This utility will read the SAR object module from the file assigned to DDNAME OBJIN, e.g., File One of the distribution tape, and will read any control statements for console options or message defaults from DDNAME SYSIN. The object code will be modified to reflect all control statements processed and the SAR program will be written to DDNAME OUTPUT. The format of the IPL records will be determined by the PARM option and the allocation of the DDNAME OUTPUT. FDRSARLR can also apply INNOVATION-supplied fixes ("zaps") to SAR as it copies it.

This utility will print a processing summary map upon completion. This map will indicate the location of the SAR program, console options, message defaults, and loader utility options in effect.

**EXECUTING  
SAR  
FROM TAPE**

The SAR program may be loaded from unlabeled tape or standard labeled tape. The FDR distribution tape is standard labeled with the first file containing a loadable SAR program. If this tape is used, the initial program load function (IPL) must be performed five times to bypass the labels. You may create an unlabeled tape containing SAR by using the Stand-Alone loader utility (FDRSARLR), or by copying File One to an unlabeled tape with IEBGENER, using DCB attributes of (RECFM=F, BLKSIZE=80, LRECL=80). FDRSARLR must be used if you wish to change options or apply fixes.

**EXECUTING  
SAR  
FROM DISK**

SAR may be loaded from disk, after you execute the loader utility using the JCL documented in [Section 30.23](#), JCL Examples. On disk, SAR is written to cylinder 0, track 0 (the label track) so it occupies no space on the volume. SAR can be written to any disk that does not already contain IPL text (such as the MVS SYSRES volume or a volume containing the IBM stand-alone memory dump (SAD). The loader will not let you accidentally overwrite other IPL text.

**EXECUTING  
SAR  
FROM A DECK**

SAR may be loaded from a deck, after you execute the loader utility using the JCL documented in [Section 30.23](#), JCL Examples. You may punch the deck onto cards, or may write the card images to a standard labeled or unlabeled tape.

**EXECUTING  
SAR UNDER  
VM FROM A  
VIRTUAL  
READER**

SAR may be loaded from a virtual reader, after you follow the instructions above to set up for executing SAR from a deck. This procedure will create fixed length 80 byte records that can be used as input to a virtual reader. You may also use File One of the distribution tape as input for a virtual reader as the file is in fixed length 80 byte records.

**CONTROL  
STATEMENTS**

SAR is distributed with defaults for all options except console addresses. If these defaults do not match your environment all console options and message defaults can be supplied via loader utility control statements. The loader will change the output copy of SAR to have the new values.

All message defaults specified on FDRSARLR control statements may be overridden at IPL time, if they are specified with equal signs (=), and OVERRIDE=N is not specified.

If OVERRIDE=N is specified to FDRSARLR, then no options can be overridden at IPL time, and the operator will not be prompted. A copy of SAR with OVERRIDE=N must not be the only copy; another copy must be available in case it is necessary to override the default options. If an option is specified to FDRSARLR with a hyphen (-) instead of an equal sign, then that option will not normally be able to be overridden at IPL time, and the operator will not be prompted for it. However, the operator will always be prompted for the first option line, which includes OVERRIDE=, and if the operator specifies OVERRIDE=C, then he will be prompted for all options and will be able to override any of them.

Loader control statements may also be used to apply fixes to SAR.

CONTINUED . . .

## 30.20 CONTINUED . . .

**STAND-ALONE  
LOADER  
SECURITY  
OPTIONS**

This utility supports Security checking if OBJIN or OUTPUT points to a disk volume ([See Section 91 and 92](#)).

- RACF authority will be checked at the volume level, if the RACF or ALLCALL option has been enabled.
- If the OPENEXIT option has been enabled, this utility will take the OPEN exit ([Section 91.10](#)).

The parameter list passed to the OPEN exit will contain the following codes:

Byte 4 – Type of operation

‘S’ for FDRSARLR

Byte 5 – Mode of operation

‘D’ (as if DUMP) for READ access

‘R’ (as if RESTORE) for WRITE access

Byte 6 – Options

‘Z’ for absolute track

**30.21 STAND-ALONE LOADER UTILITY JOB CONTROL REQUIREMENTS****JOB  
STATEMENT**

The JOB Statement is user-specified and depends upon installation standards.

**EXEC  
STATEMENT**

Must specify the name of the Stand-Alone Loader utility program (FDRSARLR). The EXEC statement may also contain a region requirement of 256K. The PARM operand may specify one or more of the following options.

**PARM = REWRITE | ERASE  
DECK  
PRSYSIN**

If more than one operand is specified, the operands must be enclosed in parentheses or apostrophes and separated by commas. Operands may be specified in any order.

**REWRITE**

Only meaningful if the OUTPUT DD statement specifies a disk. Directs the loader utility to write the SAR program to record four of cylinder zero track zero on a volume where record four already contains a loadable version of INNOVATION's SAR.

The default, if neither REWRITE nor ERASE is specified and the OUTPUT DD statement specifies a disk, is to direct the loader utility to write the SAR program to record four of cylinder zero track zero on a volume where record four was not previously present. However, REWRITE is assumed if both OBJIN and OUTPUT point to the same disk.

**ERASE**

Only meaningful if the OUTPUT DD statement specifies a disk. Directs the loader utility to erase record four of cylinder zero track zero on a volume that already contains a loadable version of INNOVATION's SAR. No output copy of SAR will be written.

The default is discussed above under REWRITE.

**DECK**

Only meaningful if the OUTPUT DD statement specifies a tape. Directs the loader utility to write a loadable SAR program to DDNAME OUTPUT as fixed-length 80 byte records.

This output format is used automatically if the OUTPUT DD statement specifies a unit record device or a SYSOUT data set.

The default, if DECK is not specified and the OUTPUT DD statement specifies a tape, is to direct the loader utility to write the SAR program to the tape in a tape-oriented format with just two records. Normally this is preferable.

**PRSYSIN**

Directs the loader utility to print all records read from DDNAME SYSIN.

The default is that the records read from SYSIN will not be printed, unless the loader utility detects an error.

CONTINUED . . .

## 30.21 CONTINUED . . .

<b>STEPLIB OR JOB LIB DD STATEMENT</b>	If required, must specify the load module library in which FDR and the loader utility reside. This must be an authorized library.
<b>SYS PRINT DD STATEMENT</b>	Specifies the primary output message data set. This is a required DD statement and is usually a SYSOUT data set.
<b>SYS DUMP DD STATEMENT</b>	Specifies the ABEND DUMP data set. Usually a SYSOUT data set.
<b>OBJIN DD STATEMENT</b>	<p>Specifies the input to the loader utility as either:</p> <ul style="list-style-type: none"> <li>– A data set that contains the object code that will be used to construct a SAR program used to IPL. This data set must not be a temporary data set if allocated to disk. This may be file 1 of FDR distribution tape (DSN=FDRSAR1), member SAROBJ of the FDR Installation Control Library (ICL, <a href="#">See Section 90</a>), or any other IPL-able copy of SAR that you have created.</li> <li>– A disk volume to which this utility has previously written a loadable version of INNOVATION's SAR program.</li> </ul> <p>NOTE: In this case, the OBJIN and OUTPUT DD statements may specify the same disk volume. This provides a convenient method to change the console options or message defaults.</p> <p>OBJIN is not required if PARM=ERASE is specified.</p>
<b>OUTPUT DD STATEMENT</b>	<p>Specifies the output device for the loader utility as either a 9340, 3380 or 3390 disk pack, a tape drive containing a labeled or unlabeled tape, a card punch, or a SYSOUT data set that will be directed to a card punch.</p> <p><b>**WARNING** – If this DD is allocated to a disk device it can *NOT* be the active system's IPL volume, or an alternate system's IPL volume. Also the volume must *NOT* contain an IBM Stand-Alone storage dump program.</b></p> <p>Under VM, if SAR will be run only in a virtual machine, and the output device is a minidisk, it may be any 9340, 3380 or 3390 minidisk in OS format; but for the SAR to be able to run in a real machine, the minidisk must start at physical cylinder zero.</p>
<b>SYSIN DD STATEMENT</b>	Optional. If present, specifies a data set containing control statements. The control statements can specify the console to be used by the Stand-Alone program, and/or can change defaults, and/or apply fixes.



**30.22 STAND-ALONE LOADER UTILITY CONTROL STATEMENTS****CONTROL  
STATEMENT  
FORMAT**

The control statements may start in any column from 1 to 60. If keywords contain multiple words (Ex: CONSOLE DEVICE=), exactly one blank must be specified between words. A control statement may not be continued. Only one keyword may be specified per statement, even though multiple keywords may appear on the same line when the SAR runs.

An asterisk (\*) in column 1 indicates a comment.

**CONTROL  
STATEMENT  
PROCESSING**

If the Stand-Alone loader utility determines that a control statement contains an error, the control statement and an error message will be printed. Any other control statements will be checked for validity, and the output phase will be bypassed.

**CONSOLE  
CONTROL  
STATEMENTS****CONSOLE DEVICE=dddd**

Specifies the device type of the console to be used by SAR. If not specified, SAR will determine at IPL time the type of console.

<b>DEVICE TYPE</b>	<b>OPERAND (dddd)</b>
2250	2250
Printer/Keyboard	3215
3066 (370/165-168 CONSOLE)	3066
327x (3270 FAMILY)	3270

**CONSOLE UNIT=uuu**

Specifies the address of the console to be used by SAR. If not specified, at IPL time SAR will accept the first attention interrupt as indicating the console that it should use. You may specify up to five CONSOLE UNIT statements. At IPL time, SAR will attempt to communicate with each address in the order that the CONSOLE UNIT statements appeared, and will use the first address that responds.

**CONSOLE  
MESSAGE  
DEFAULTS**

The following is a list of console message defaults that the loader will accept. A complete explanation of the keywords and valid response(s) can be found in [Section 30.04](#), SAR Console Messages.

If OVERRIDE=N is not specified:

The following control statements may be specified either with equal signs (=), as shown, or with hyphens (-). If an equal sign is used for a certain option, then the operator will be prompted for that option when the SAR is IPLed, and will be able to override it. If a hyphen is used for a certain option, then the operator will not normally be prompted for that option, and will not normally be able to override it.

Exception 1: A hyphen cannot be specified for HRDCOPY DEVICE= or OVERRIDE=; the operator will always be prompted for the first option line, which contains these options.

Exception 2: For CPY=, BUFNO=, and COREDUMP=, it makes no difference whether an equal sign or a hyphen is specified. These options are displayed by SAR on the same line as VOLUME SERIAL=. If VOLUME SERIAL- is specified (with a hyphen), then the operator will not be prompted for any options on this line.

If the operator specifies OVERRIDE=C on the first option line, then he will be prompted for all options, and will be able to override them, whether they were specified with an equal sign or with a hyphen.

CONTINUED . . .

**30.22 CONTINUED . . .**

If OVERRIDE=N is specified:

The operator will not be prompted for any options when the SAR is IPLed, and will not be able to override any. A copy of SAR with OVERRIDE=N must not be the only copy; another copy must be available in case it is necessary to override the default options.

**HRDCOPY DEVICE=mmmm**

**OVERRIDE=x**

**HRDCOPY UNIT=uuu**

**OPERATION REQUEST=mmmmmmm**

**TYPE=mmmm**

**INPUT TAPE DEVICE=tttt,n** (see Note)

**INPUT TAPE UNIT=uuu,fff** (see Note)

**MODE=mm**

**OUTPUT DISK UNIT=uuu** (see Note)

**OUTPUT DISK DEVICE=dddddd** (see Note)

**VOLUME SERIAL=vvvvvv**

**CPY=r**

**BUFNO=n**

**COREDUMP=c**

NOTE: If OPERATION REQUEST=DUMP is specified, then FDRSARLR will accept control statements of OUTPUT TAPE DEVICE=, OUTPUT TAPE UNIT=, INPUT DISK UNIT=, and INPUT DISK DEVICE=.

The Stand-Alone loader will also accept VER and REP statements, in the same format used by the IBM superzap utility AMASPZAP. These can be used to apply INNOVATION-provided fixes ("zaps") to SAR.

As long as all VERs match the current contents of SAR from OBJIN, SAR will apply the changes specified by the REPs to the SAR written to OUTPUT.

A DUMP statement is also supported to print a DUMP of the SAR program. NAME statements and other Superzap statements are not supported.

If OPERATION REQUEST= is not specified, and you want to override the TAPE or DISK device or unit, the keywords must be INPUT TAPE or OUTPUT DISK. If the operator then specifies OPERATION REQUEST=DUMP when SAR is executed, the Stand-Alone program will automatically change the console display to show OUTPUT for the TAPE and INPUT for the DISK.

## 30.23 STAND-ALONE LOADER UTILITY JOB CONTROL EXAMPLES

**LOAD SAR TO  
DISK VOLUME**

This JCL will execute program FDRSARLR, the Stand-Alone loader utility, to specify the console address, change a console message default, and place SAR onto a disk volume.

```
//SATODI SK      EXEC PGM=FDRSARLR, REGI ON=256K
//SYSPRI NT      DD   SYSOUT=*
//SYSUDUMP       DD   SYSOUT=*
//OBJI N         DD   UNI T=TAPE, VOL=SER=FDR52P,          FDR52T i f Tri al
//               DSN=FDRSAR1, DI SP=
//OUTPUT         DD   UNI T=3380, VOL=SER=vvvvvvv, DI SP=SHR
//SYSI N         DD   *
                CONSOLE DEVI CE=3270
                CONSOLE UNI T=005
                OPERATI ON REQUEST=DUMP
/*
```

**NOTE: Specifying a console message control statement changes the default that appears on the console. Since the statement is coded with an equal sign (=) and not a hyphen (-), the option can be overridden at execution time.**

**LOAD SAR  
TO DISK  
WITH NON-  
OVERRIDABLE  
OPTIONS**

This JCL will execute program FDRSARLR, the Stand-Alone Loader utility, to place SAR onto a disk volume. All of the processing options are specified by FDRSARLR, except some for which the built-in defaults are acceptable, and the operator will not be allowed to override any options when SAR is executed. The purpose of this copy of SAR will be to restore a one-pack Operating System when the regular Operating System cannot be IPLed.

```
//SATODI SK      EXEC PGM=FDRSARLR, REGI ON=256K
//SYSPRI NT      DD   SYSOUT= *
//SYSUDUMP       DD   SYSOUT=*
//OBJI N         DD   UNI T=TAPE, VOL=SER=FDR52P,          FDR52T i f Tri al
//               DSN=FDRSAR1, DI SP=OLD
//OUTPUT         DD   UNI T=3390, VOL=SER=vvvvvvv, DI SP=SHR
//SYSI N         DD   *
                CONSOLE DEVI CE=3270
                CONSOLE UNI T=OE2
                CONSOLE UNI T=OF2
                HRDCOPY DEVI CE=3211
                OVERRI DE=N
                HRDCOPY UNI T=OOF
                OPERATI ON REQUEST=RESTORE
                TYPE=FULL
                I NPUT TAPE DEVI CE=3480, 2
                I NPUT TAPE UNI T=390, 001
                MODE=D4
                OUTPUT DI SK UNI T=420
                OUTPUT DI SK DEVI CE=3390-1
                VOLUME SERI AL=MI NI RS
```

**NOTE: Because OVERRIDE=N is specified, the operator will not be able to change any of the processing options. This must not be the only available copy of SAR!**

CONTINUED . . .

## 30.23 CONTINUED . . .

**LOAD SAR TO  
DISK WITH  
HARD-CODED  
OPTIONS**

This JCL will execute program FDRSARLR, the Stand-Alone loader utility, to place SAR onto a disk volume. Some processing options are hard-coded with a hyphen (-) so that the operator will not normally be prompted for them, and others are specified with an equal sign (=) so that the operator will always be prompted for them.

```
//SATODISK EXEC PGM=FDRSARLR, REGI ON=256K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//OBJIN DD DISP=SHR, DSN=I DP. I CLFDR52(SAROBJ)
//OUTPUT DD UNIT=SYSDA, VOL=SER=vvvvvvv, DISP=SHR
//SYSIN DD *
        CONSOLE DEVICE=3270
        CONSOLE UNIT=OF2
        HRDCOPY DEVICE=3203
        HRDCOPY UNIT=O1E
        OPERATION REQUEST-RESTORE
        TYPE-FULL
        INPUT TAPE DEVICE=348X, 2
        INPUT TAPEUNIT=A44
```

**NOTE:**The options specified with hyphens cannot be overridden when SAR is executed, UNLESS the operator specifies **OVERRIDE=C**.

**LOAD SAR  
TO TAPE**

This JCL will execute program FDRSARLR, the Stand-Alone loader utility, to place SAR onto an unlabeled tape volume.

```
//SATOTAPE EXEC PGM=FDRSARLR, REGI ON=256K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//OBJIN DD UNIT=TAPE, VOL=SER=FDR52P, FDR52T if Trial
// DSN=FDRSAR1, DISP=OLD
//OUTPUT DD UNIT=TAPE, LABEL=(, NL), VOL=SER=I PLSAR,
// DSN=I PLSAR, DISP=(, KEEP)
```

To place the Stand-Alone program onto a standard labeled tape volume, use the same JCL, except change the last two lines as shown below. This is not recommended, since you will have to perform the IPL function five times

```
//OUTPUT DD UNIT=TAPE, VOL=SER=I PLSAR,
// DSN=I PLSAR, DISP=(, KEEP)
```

CONTINUED . . .

## 30.23 CONTINUED . . .

**PUNCH  
SAR TO CARDS**

This JCL will execute program FDRSARLR, the Stand-Alone loader utility, to punch SAR to cards. The example assumes that SYSOUT Class B is directed to a card punch.

```
//SATOCARD      EXEC  PGM=FDRSARLR, REGI ON=256K
//SYSPRI NT      DD    SYSOUT=*
//SYSUDUMP       DD    SYSOUT=*
//OBJI N         DD    DI SP=SHR, DSN=I DP. I CLFDR52(SAROBJ)
//OUTPUT         DD    SYSOUT=B
```

**MODIFYING  
SAR ON DISK**

This JCL will execute program FDRSARLR, the Stand-Alone loader utility, to MODIFY the object module for SAR and write it back to disk. This example assumes that SAR was previously loaded to disk.

```
//SAZAP          EXEC  PGM=FDRSARLR, REGI ON=256K
//SYSPRI NT      DD    SYSOUT=*
//SYSUDUMP       DD    SYSOUT=*
//OBJI N         DD    UNI T=3380, VOL=SER=xxxxxx, DI SP=SHR
//OUTPUT         DD    UNI T=3380, VOL=SER=xxxxxx, DI SP=SHR
//SYSI N         DD    *
                   VER aaaa      dddd      VERI FY ' dddd' at   address ' aaaa'
                   REP aaaa      eeee      REPLACE' eeee' at   address ' aaaa'
                                   DUMP Pri nt SAR obj ect modul e
```

**NOTE:**This example of modifying SAR on disk is provided to show how future maintenance can be done to SAR if needed.

**ERASING SAR  
FROM DISK**

This JCL uses FDRSARLR to erase a copy of SAR that was previously placed on a disk. ERASE verifies from disk that the label track does contain SAR, so it will not erase any other IPL text.

```
//SAERASE        EXEC  PGM=FDRSARLR, REGI ON=256K, PARM=ERASE
//SYSPRI NT      DD    SYSOUT=*
//SYSUDUMP       DD    SYSOUT=*
//OUTPUT         DD    UNI T=3390, VOL=SER=xxxxxx, DI SP=SHR
```

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# CPK

COMPAKTOR®

USER DOCUMENTATION

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**40.01 COMPAKTOR INTRODUCTION**

**CPK** COMPAKTOR (CPK) is a disk management utility which provides an efficient and flexible tool for reorganizing direct-access volumes.

COMPAKTOR's primary function is to reduce free space fragmentation on a volume. In addition, CPK can combine non-VSAM multi-extent data sets and VSAM multi-extent components into one extent. CPK provides the capability of enlarging and/or moving the VTOC.

CPK can release unused space within PS and PO data sets and VSAM components, or some of that free space can be retained for expansion of the dataset. CPK can free space as part of a volume reorganization or as an independent function.

COMPAKTOR V5.2 Level 30 with the FASTCPK option consolidates free space, merges extents, positions data sets and releases space from volumes **without taking an FDR backup**.

FASTCPK achieves the same level of free space consolidation and reduction of multi-extent data sets as regular COMPAKTion that requires a backup. FASTCPK accomplishes this without compromising the integrity of your data. FASTCPK maintains a log of its processing and provides an automatic recovery function which allows COMPAKTion to be restarted if the operating system or the job fails.

A new algorithm has been added which substantially reduces the number of tracks CPK is required to move to achieve the same level of COMPAKTion as the prior version.

FASTCPK performs the reorganization in **50 to 90%** less elapsed and CPU time than a regular COMPAKTion due to in-place COMPAKTion, its new algorithms and I/O performance options. FASTCPK can COMPAKT many volumes in a single execution with simple control statements (Ex: CPK TYPE=FASTCPK,VOL=(TSO\*,WORK\*)).

FASTCPK can be run daily with conditional statements that will only select volumes requiring COMPAKTion (those exceeding a number of free space areas or IBM's Fragmentation Index). FASTCPK elapsed time can be further reduced by selecting a level of improvement FASTCPK is to achieve. On the weekends FASTCPK can be run against all the volumes to achieve a maximum level of COMPAKTion. [See Section 40.26](#) for "Recommendations for Scheduled Use of COMPAKTOR".

**FASTCPK WILL COMPAKT VOLUMES TO A SMALLER NUMBER OF FREE SPACE AREAS IN A FRACTION OF THE TIME OF COMPETING PRODUCTS.**

CPK provides both detail and summary reports on the condition of the volume, space usage and fragmentation, and dataset types and placement. Summaries from before and after COMPAKTion are displayed side-by-side. COMPAKTOR also has a simulation capability to provide a preview of the improvements that it can make on the volume, or to test the result of various options.

CPK can reorganize an active volume (currently in use) using the data set enqueue option (DSNENQ=). CPK will determine which data sets are currently active, bypassing moving or releasing space on these data sets. All inactive data sets will be enqueued on, preventing their use during the COMPAKTion or release function.

FDR and FDRABR have the option to execute COMPAKTOR to COMPAKT the volume after a successful full volume dump. [See Sections 10](#) and [50](#) for details.

**COMPAKTOR V5.2 Level 30 and higher can now be licensed as a separate product without a requirement that you be licensed for FDR.**

**40.02 COMPAKTOR BACKGROUND**

The continuing increase in the number and size of direct-access devices in most installations has created a number of problems and requirements. Many can be resolved by periodically reorganizing disk volumes.

**FREE SPACE  
FRAGMENTATION**

Many a disk pack has small non-contiguous areas of free space spread haphazardly throughout the volume. Although the primary allocation of a new dataset can be satisfied in up to 5 extents if no single free space extent is large enough, this may force the dataset to be allocated from two or more non-contiguous free areas, affecting its performance. In some cases, though the total available free space on a volume exceeds a user's space request, it becomes impossible to satisfy the request in 5 extents.

**MULTIPLE  
EXTENTS**

Either through natural growth or inaccurate space estimates, data sets tend to grow beyond their original allocated data space. They may end up owning anywhere from 2 to 16 different extents (up to 123 extents for ICF VSAM components and some SMS-managed datasets). It may become impossible to extend the dataset even though a large amount of free space is available on the volume.

**INEFFICIENT  
DATA SET  
PLACEMENT**

When using the most common methods of allocating data set space, a user has no direct control over the position on a volume of the allocated data set; thus, the most active data sets on a disk pack may be at opposite ends of the pack. This leads to excessive arm movement on that volume, and increases the total access times for the involved data sets. If two widely separated datasets are used by the same application, this may greatly increase the elapsed or response time of that application.

**WASTED  
SPACE**

Often, many non-volatile data sets occupy a larger data space than necessary; this is caused by inaccurate data space requirement estimates. The result is to effect a net loss in available free space on the involved volumes.

**SMALL VTOCs**

Sometimes, a VTOC becomes full and a user finds it impossible to allocate data sets on that volume, even though free space is available. This is a problem, since ways of easily increasing a VTOC's size are conspicuous by their absence.

**INACCURATE  
VTOCs**

Repeated hardware/software system failures may lead to inaccurate VTOCs which do not reflect the true status of their volumes. This is a dangerous condition and can cause loss of data.

**SYSTEMS  
PERFORMANCE**

The above mentioned symptoms, when prevalent, tend to deteriorate a system's performance; total system throughput is degraded and TSO and online systems evidence poor response times. Moreover, this deterioration often occurs imperceptibly, over some period of time; thus, the user may have difficulty in determining its causes. In some cases, it can lead to premature hardware upgrades.

**WHY DISK  
PACKS ARE  
SELDOM  
REORGANIZED**

Although most sophisticated users recognized and understood these problems and the need to reorganize disk packs, in practice they seldom did so. The reason is that, without COMPAKTOR, reorganizing a disk pack is a slow, laborious and error-prone process; very few users thought that the benefits of reorganization outweighed its difficulties.

**CONVERSION  
BETWEEN DISK  
MODELS**

Within a given type of disk, such as 3390, several models are available, with different densities and capacities, and users often need to convert volumes from one model and density to another. However, because of the different capacities, the ideal locations for the VTOC and the size of the VTOC vary from one model to another. During the conversion, users usually want to move and expand (or shrink) the VTOC, and to position VTOC indexes and VVDSs near the VTOC. (Note that CPK cannot be used to convert between different types of disks, such as 3380 to 3390; [See Sections 20 and 21](#) for information on using FDRDSF and FDRCOPY for unlike device conversion).

The following sections of this manual describe how INNOVATION DATA PROCESSING has solved these problems, with its COMPAKTOR program product.

**40.03 COMPAKTOR OVERVIEW**

COMPAKTOR provides an efficient and easy-to-use method of reorganizing a disk volume, positioning data sets or releasing unused space within data sets. It does this via a simple one-step process, with a minimum of JCL and control statements requirements.

- FEATURES** **REDUCTION OF FREE SPACE FRAGMENTATION.** On most volumes, CPK drastically reduces the number of free spaces, through contiguous placement of data sets. CPK will attempt to place data sets as close to the VTOC as possible.
- MERGING OF DATA SET EXTENTS.** Most multi-extent data sets will be merged into a single extent by COMPAKTOR.
- DATA SET POSITIONING.** COMPAKTOR has a flexible and convenient feature for user-specified data set placement. Data sets can be positioned either by absolute or relative positions, singly or as a group.
- ELIMINATION OF UNUSED DATA SET SPACE.** A user may free all or part of the unused space within physical sequential (PS), partitioned (PO), and/or ICF VSAM data sets. The freeing of space can be done during COMPAKTion or as a independant option of CPK (TYPE=RLSE).
- VTOC POSITION AND SIZE.** COMPAKTOR allows the user to change the position and size of the VTOC. Optionally, unused entries in a VTOC can be eliminated when embedded between active entries, placing all active DSCBs in front of inactive ones to reduce VTOC search time.
- VTOC ANALYSIS.** COMPAKTOR always performs a complete analysis of a VTOC, often detecting structural VTOC errors not detected by any IBM software. Any errors detected result in diagnostic messages. Under some conditions, CPK even corrects VTOC errors.
- ERROR FREE VTOCS.** After a successful COMPAKTion, all reorganized disk packs have error-free VTOCs. The volume free space (in Format 5 DSCBs or the indexed VTOC) will be accurate.
- SCRATCH FEATURE.** CPK can eliminate temporary data sets and any user-specified non-VSAM data sets, except on SMS-managed volumes.
- SYSCTLG PLACEMENT OPTIMIZATION.** When an OS CVOL catalog is present CPK positions it as near the VTOC as possible.
- VOLUME MAPS.** CPK provides track maps of disk packs, in track sequence. Maps of a volume both before and after COMPAKTion are automatically provided. CPK also provides a summary report on the status of the volume.
- MAPPING FEATURE.** As an option, a user can request that CPK only map a volume. The volume may be a disk pack residing on a direct-access device or an FDR backup of a disk volume residing on a tape or sequential file on disk. Full VTOC analysis is still performed.
- SIMULATION FEATURE.** This feature provides full maps of a disk pack both before and after reorganization or release. However, no actual COMPAKTion is performed and the volume is never modified. The volume may be a disk pack on a direct-access device or an FDR backup residing on tape or a sequential file on disk.
- MULTIPLE VOLUME FUNCTIONS.** For most functions, COMPAKTOR can process multiple disk volumes in one execution. Multiple disk volumes can be specified as a list of volume serials, a volume serial prefix, or all online disk volumes can be requested. The required online disks volumes are dynamically allocated.

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**FAST  
COMPAKTION  
IN-PLACE**

If TYPE=FASTCPK is specified on the COMPAKT control statement, COMPAKTOR does a “COMPAKT-in-place” on one or more disk volumes, without taking or requiring a FDR backup. For each volume processed, COMPAKTOR analyzes the dumped VTOC and builds an internal map of the disk pack. A number of algorithms are then used to determine the “best” way of organizing the disk pack, and a new internal map is built; this new map is of the reorganized, or COMPAKTed, disk pack. User-specified dataset placement or space release requests are honored during these algorithms.

Once this has been successfully done, COMPAKTOR rebuilds the extent information contained in the VTOC (and, if necessary, the VVDS). After the VTOC is rebuilt, COMPAKTOR moves tracks to their new locations according to the new volume organization map.

Fast COMPAKTion achieves the same level of free space consolidation and reduction of multi-extent data sets as COMPAKTion from backup, without compromising the integrity of your data. FASTCPK maintains a log of its processing and provides an automatic recovery function which allows COMPAKTion to be restarted if the operating system or the job fails.

Fast COMPAKTion requires that there be at least a small amount of free space on the volume, in order to allocate a “recovery” data set used to keep track of COMPAKTOR’s progress and allow restart if COMPAKTOR is prevented from completing its data movement.

Fast COMPAKTion supports most of the features of COMPAKTOR, except that you cannot change the size or location of the VTOC or VVDS, and you cannot scratch data sets.

**COMPAKTION  
FROM BACKUP**

COMPAKTOR can also perform its volume reorganization function (TYPE=COMPAKT specified or defaulted) by reading an FDR or ABR full-volume backup and restoring its contents to a disk volume. In many cases, CPK will be restoring a backup just taken of a disk volume back onto that same volume, for a COMPAKTion “in-place”. However, it is possible to COMPAKT from backups taken at another time, and to output to a different disk volume (to move volumes or convert to new density disks). Fast COMPAKTion is a better choice for in-place COMPAKTion unless you need to move or expand the VTOC, move the VVDS or scratch data sets.

CPK can perform the FDR backup within the COMPAKTion run using the DUMP=YES option.

COMPAKT-from-backup performs the same analysis of the VTOC and executes the same reorganization algorithms, except that the copy of the VTOC on the backup tape is used. After the VTOC and VVDS are updated, tracks are restored from the backup tape to their new locations.

Normally, the volume label on the dumped disk pack is restored onto the target volume. As an option, COMPAKTOR allows you to retain the volume label on the target volume. However, volumes containing ICF VSAM clusters, or SMS-managed volumes, will not be usable if the volume serial is changed.

**SPACE  
RELEASE**

If TYPE=RLSE is specified on the COMPAKT control statement, COMPAKTOR makes a special run whose only purpose is to release space from PS, PO, and ICF VSAM datasets. TYPE=RLSE does not move any datasets or attempt to reduce fragmentation or increase the size of free space. It does not require a backup of the disk volume; it simply reads the VTOC from the disk, manipulates it to release space as indicated by CPK options, and updates the VTOC in place.

So, a TYPE=RLSE step will usually run in just a few seconds.

COMPAKTOR will print the name of each data set selected and the number of tracks released from each.

**40.04 COMPAKTOR SPECIAL FEATURES****COMPAKT  
FROM BACKUP  
ON DISK**

COMPAKTOR supports FDR backups which reside as sequential data sets on disk. The FDR backup must not reside on the volume being COMPAKTeD. The FDR backup created during a COMPAKT specifying DUMP=YES should not specify a temporary data set name or a disposition of DELETE, since this data set is the backup which must be used to recover if COMPAKTion fails during the restore phase. Sufficient space must be specified to contain the backup. Secondary allocation and RLSE are recommended. It is recommended that the backup on disk be kept for a least two working days.

**ICF VSAM  
SUPPORT**

COMPAKTOR treats ICF VSAM clusters (including linear clusters and DB2 files) much like any other dataset. Components will be relocated on the volume, and multi-extent components will be combined into a single extent (unless VSAMEXT=KEEP is specified, in which case CPK will attempt to position all the extents contiguously, one after the other). You may also request that CPK release space from over-allocated VSAM components, based on the HI-USED-RBA in the VVDS, by specifying VSRLSE=ALL on the CPK statement or on a SELECT statement that applies to the component. A percentage of the over-allocated space may be left as unused control areas for expansion by specifying %FREE= or %VSFREE= on the CPK statement or %FREE= on the SELECT statement.

CPK cannot release space from multi-volume VSAM components, and will only merge extents residing on the first volume of a multi-volume component. Also, CPK will not release space from any cluster where the "open for output" flag is on in the VVDS, even if the cluster is not currently allocated to another job, since the HI-USED-RBA may be inaccurate (IDCAMS VERIFY can reset that flag and correct the RBA).

By default, CPK will not relocate nor release space from components of ICF catalogs. To do so, you must specify OVERRIDE=YES on the CPK statement and provide a SELECT DSN= with the fully-qualified name of each catalog component (the catalog name for the data component, and the "catindex" name for the index component); space will not be released unless VSRLSE=ALL is specified on the SELECT statement. CPK will never release space from a VVDS, but it can merge extents and relocate the VVDS if OVERRIDE=YES is specified and a SELECT selects it (the SELECT does not necessarily have to specify the fully-qualified VVDS name, a filter can select it). It is the user's responsibility to ensure that the catalogs and VVDS are not in use when this is done (the F CATALOG console command can be used to close them, see the appropriate IBM SYSTEM COMMANDS manual).

NOTE: VSAM clusters which do not reside in an ICF catalog will be treated as unmovable data sets by CPK.

**COMPAKTING  
ACTIVE  
VOLUMES**

The data set enqueue option (DSNENQ=) coupled with the data set unmovable table, gives the user the capability to COMPAKT active volumes.

The DSNENQ= option is used to request that COMPAKTOR use a SYSDSN ENQ to determine which data sets on the volume being COMPAKTeD are currently active (allocated) and optionally ENQs inactive data sets to COMPAKTOR so that no user can use them until COMPAKTOR is done with the volume. The COMPAKTOR unmovable table can be used to identify data sets which are not normally ENQed by the system but which should be considered unmovable anyways.

Space release (TYPE=RLSE) and Fast COMPAKTion (TYPE=FASTCPK) default to DSNENQ=USE and will automatically identify active data sets and bypass moving and releasing them.

COMPAKT-from-backup (TYPE=COMPAKT specified or defaulted) supports COMPAKTING active volumes only when the DUMP=YES option is specified (to invoke FDR for a backup) or when COMPAKTOR is invoked by the COMPAKT option of FDR or ABR. The DSNENQ= option must be specified on the FDR/ABR DUMP statement, not on the COMPAKT statement.

**Please read [Section 40.24](#) for details before attempting to COMPAKT any active volumes.**

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**DATA=USED  
OPTION**

COMPAKT-from-backup supports backups created using the DATA=USED option of FDR and ABR. This option can reduce the execution time of COMPAKTOR, if there exists a large amount of unused space within PS or PO type data sets. Care should be taken if there exist data sets which contain an invalid last block pointer (DS1LSTAR).

DATA=USED is specified on the FDR DUMP control statement.

EXAMPLE:            DUMP            TYPE=FDR, DATA=USED  
                      CPK            DUMP=YES

Normally, CPK will not release space on a data set which has a last block pointer of zeroes (empty data set). If LBPZERO=VALID is specified, CPK will release all but one track or cylinder (if cylinder allocated). Care should be used specifying this option, since some data sets may have a zero last block pointer and may not be empty (ex: SYS1.DUMP data sets).

Fast COMPAKTion (TYPE=FASTCPK) supports a DATA= operand on the COMPAKT statement. DATA=USED (the default) only moves used tracks with PS, PO and ICF VSAM data sets.

**UNMOVABLE  
DATA SETS**

COMPAKTOR supports an internal table of unmovable data sets. The user may specify data set names or groups that should always be considered unmovable. This list of names is stored in a load module in the CPK program library, and can be built using either the FDR/CPK/ABR ISPF panels (option A.I.5, [See Section 92](#)) or program FDRZAPOP ([See Section 91](#)). Entries in the unmovable table and datasets identified as active can be moved by CPK SELECT statements if OVERRIDE=YES is specified in the unmovable table or on the CPK control statement. This option should be used with care. If OVERRIDE=NO, CPK will ignore any request to move or release space for any data set found in these tables.

**INDEXED  
VTOC**

COMPAKTOR can be used to reorganize a volume containing an active indexed VTOC.

Fast COMPAKTion and space release will update the space maps in the VTOCIX directly, without disabling it. For COMPAKT-from-backup, COMPAKTOR will convert the volume with the indexed VTOC to an OS VTOC prior to COMPAKTion. After a successful COMPAKTion, CPK will then execute ICKDSF to rebuild the indexed VTOC. CPK will suppress the normal ICKDSF messages and operator replies. If ICKDSF should fail to convert the volume, CPK will issue an error message with the ICKDSF condition code.

CPK will not move the SYS1.VTOCIX data set unless the user specifies this data set name in the control statements and OVERRIDE=YES is indicated; you may wish to do this in order to move the VTOCIX next to the VTOC. Be sure that the volume is not online to any other CPU if the VTOCIX is moved.

**VOLUME  
EXCLUSION**

You may exclude (protect) certain volumes from COMPAKTOR processing by making special entries in the COMPAKTOR Unmovable Table. If COMPAKTOR finds a name in the Unmovable Table in the format:

FDRCPK. EXCLUDE. COMPAKT. Vvvvvvvv

any attempt to do any COMPAKTion on volume "vvvvvv" will result in a warning. If the name is:

FDRCPK. EXCLUDE. RELEASE. Vvvvvvvv

then space release (TYPE=RLSE) will be inhibited. If the name in the table is a DSN entry, then only the named volume is excluded. If the entry is a DSG, then "vvvvvv" must be 5 or fewer characters and all volumes starting with that prefix will be excluded.

For example, entries of

DSN FDRCPK. EXCLUDE. COMPAKT. VTS0123  
DSG FDRCPK. EXCLUDE. RELEASE. VTSO

will exclude volume TS0123 from COMPAKTion functions, and will exclude all TSO volumes from release processing. [See Section 91.04](#) or [92.05](#) (Step 5) for details on modifying the Unmovable Table.

You can use this volume exclusion to protect certain volumes or groups of volumes that should not normally be COMPAKTed against accidental COMPAKTion or Release.

CONTINUED . . .



**40.04 CONTINUED . . .****SMS CONSIDERATIONS**

COMPAKTOR supports all functions on SMS-managed disk volumes.

Because of the restrictions of SMS, it is not possible to restore a SMS-managed volume to a new volume serial. If you are doing a COMPAKT-from-backup (COMPAKT TYPE=CPK) of a SMS-managed volume and it is not a COMPAKT-in-place (restoring back to the original volume), COMPAKTOR will force CPYVOLID=YES, so that the output disk will receive the volume serial of the original SMS volume. If the original volume is still online, the output volume will be forced offline.

COMPAKTOR will produce an informational message if the VTOC of the input volume (on disk or on the backup dataset) is marked as SMS-managed. The SMS status of the UCB of the output disk will also be checked; COMPAKTOR will not allow you to restore the backup of an SMS volume to an non-SMS UCB, and vice versa. An SMS-managed volume cannot be restored on a system which does not have SMS active.

SCRATCH=YES is not supported on SMS-managed volumes, since SCRATCH=YES does not uncatalog datasets that it scratches.

The forcing of CPYVOLID=YES and the SMS status checks can be bypassed by the operand "SMSPROT=NONE" on the COMPAKT or SIMULATE statement. SMSPROT=NONE should be used with care since it may result in a volume which is not usable by SMS.

**MODEL TYPE CONVERSIONS**

COMPAKTOR may be used to convert a volume to a different density of the same device type, even if that model has a different number of cylinders. So, COMPAKTOR may be used to convert a 3380 volume to another 3380 model, and to convert 3390 volumes to another 3390 model.

COMPAKTOR automatically recognizes the number of cylinders on the output device and will update the VTOC and free space with the proper device size. This conversion can also be done with FDR, but COMPAKTOR offers several advantages:

During the conversion, COMPAKTOR can expand and reposition the VTOC, providing more room for datasets on a larger device. COMPAKTOR can also move the indexed VTOC and VVDS next to the new VTOC, plus any other datasets that should be close to the VTOC.

Unlike FDR, COMPAKTOR can convert a volume to a model with fewer cylinders than the original. In order for this to work, all allocated datasets on the original volume must fit in the space available on the output volume, and any unmovable datasets must be at addresses within the limits of the new device. Alternately, SELECT commands with SCRATCH=YES may be used to exclude datasets until the remaining data fits.

COMPAKTOR simulation supports model conversions, even if the new devices are not yet installed on your system, so that you can prepare for the actual conversion.

When several smaller disks are to be combined into one larger disk, COMPAKTOR may be used to convert one of the source disks, under its original volume serial, and FDRCOPY ([See Section 21](#)) may be used to add data sets from the other volumes.

COMPAKT-from-backup must be used for model conversions since Fast COMPAKTion (TYPE=FASTCPK) is always a "COMPAKT-in-place", back to the original disk.

**40.05 COMPAKTOR JCL REQUIREMENTS**

The running of COMPAKTOR requires the Job Control Language (JCL) statements detailed below. As documented in [Sections 10](#) and [50](#), CPK may also be dynamically executed after an FDR or ABR full-volume dump; details and JCL requirements are in those sections.

<b>JOB STATEMENT</b>	The JOB statement is user-specified and depends upon installation standards.
<b>EXEC STATEMENT</b>	Must specify the COMPAKTOR program name -- FDRCPK. May also contain region size required and PARM field data. The recommended region is a minimum of 2048K; a region of 4096K is required for a Fast COMPACTion (TYPE=FASTCPK). You may use the PARM as the first control statement to specify the CPK, MAP, or SIM command. Additional commands, if necessary, must be specified in the SYSIN data set.
<b>STEPLIB OR JOBLIB DD STATEMENT</b>	If required, must specify the load module library in which COMPAKTOR and FDR reside. All libraries specified must be authorized.
<b>SYSPRINT DD STATEMENT</b>	Specifies the output messages data set. This is a required DD statement and is usually a SYSOUT data set.
<b>SYSMAP DD STATEMENT</b>	Specifies the output maps data set. This is a required DD statement and is usually a SYSOUT data set.
<b>SYSSUMM DD STATEMENT</b>	Specifies the combined summary data set, and will contain a two-line summary of before/after statistics for each volume processed, sorted by volser; if omitted, the combined summary is printed at the end of the SYSMAP OUTPUT.
<b>SYSUDUMP DD STATEMENT</b>	Specifies the ABEND dump data set. Although not required, we strongly urge you to always include this DD statement, so that we can help you diagnose error conditions. Usually specifies a SYSOUT data set.
<b>CPKWORK DD STATEMENT</b>	Required for COMPACT-from-backup if an active INDEXED VTOC exists on the volume being COMPACTed. Usually specifies a temporary disk data set. At least one track of space must be allocated. This data set must not be allocated on the volume being COMPACTed. It can be omitted for Fast COMPACTion and space release.
<b>IXSYSPRT DD STATEMENT</b>	Specifies the output data set for messages from ICKDSF. Required on a non-MVS system on a volume with an active indexed VTOC. Under MVS, CPK will dynamically allocate this DD statement to DD DUMMY unless it is specified. Usually a SYSOUT data set.
<b>DISK1 DD STATEMENT</b>	If COMPACTing, must specify the unit, volume serial number and disposition of the disk pack to be restored, COMPACTed or released.  If mapping or simulating, must specify the unit, volume serial number and disposition of the disk pack to be mapped, or on which a simulated COMPACTion is to be performed.  EXAMPLE:           //DI SK1       DD     UNI T=3380, VOL=SER=ABC123, DI SP=OLD  This DD statement may be omitted when mapping or simulating from an FDR dump tape, and must be omitted when VOL= operands are used to specify the online disk volume(s) to be processed. The DD name need not be DISK1 unless DUMP=YES is specified; however, if it is not, you must code the FROMDD= or TODD= operand on a major command control statement. If VOL= is used, CPK will fail if a DISK1 DD statement is found, since CPK will dynamically allocate the online disk volumes required to DISK1.

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## 40.05 CONTINUED . . .

**TAPE1 DD  
STATEMENT**

For a COMPAKT-from-backup (TYPE=COMPAKT specified or defaulted), specifies the tape volume(s) to be used for restoring a disk pack. If multiple volumes exist, they must be specified in the correct order: i.e. the order in which they were dumped.

If DUMP=YES is specified, this DD statement will be used for the backup, and usually requests scratch tapes. Following the backup, CPK will read this backup for the COMPAKTion.

If mapping or simulating from tape, specifies the first tape volume of an FDR dump. Volumes other than the first need not be specified.

The DD name need not be TAPE1 unless DUMP=YES is specified. However, if it is not, you must specify the name in the FROMDD= operand on a major command control statement.

For Fast COMPAKTion (TYPE=FASTCPK) and RELEASE (TYPE=RLSE), this DD statement is not used and should be omitted.

**TAPE11 DD  
STATEMENT**

If COMPAKTing with DUMP=YES, specifies the optional duplicate tape to be created by FDR during the dump. Under MVS, the JCL option FREE=CLOSE may be used to deallocate this tape drive before CPK begins reading the TAPE1 backup. For more information on the duplicate tape option, [see Section 10.02](#). Do not specify DISP=(NEW,CATLG) and FREE=CLOSE for TAPE11 if this dataset is to be cataloged in an ICF VSAM catalog residing on the volume being COMPAKTed.

This DD statement is never required for COMPAKTOR and is ignored on any operation except COMPAKTing with DUMP=YES.

**SYSIN DD  
STATEMENT**

Specifies the control statements data set. Usually a SYSIN data set. If omitted, COMPAKTOR assumes that the user wishes to simulate a reorganization of the disk pack specified by the DISK1 DD statement.

**40.06 COMPAKTOR COMMANDS**

COMPAKTOR commands are of two types: major commands and minor commands.

**MAJOR  
COMMANDS**

Only a single major command may appear within a group of control statements and it can only appear once. The major command determines the COMPAKTOR run type: mapping, simulation or COMPAKTion. The following major commands are supported:

- MAP** — This command tells COMPAKTOR to map one or more volumes, residing on an FDR backup or a direct-access device.
- SIMULATE** — This command causes COMPAKTOR to simulate reorganization of a volume on an FDR backup or a direct-access device.
- COMPAKT** — This command causes COMPAKTOR to reorganize one or more disk volumes.  
— If TYPE=RLSE is specified on a SIMULATE or COMPAKT command, CPK can release unused space within PS, PO, and ICF VSAM data sets. An FDR dump is not taken or used.

If no major command is input to COMPAKTOR, it assumes a default of SIMULATE when COMPAKTOR is invoked directly. When CPK is invoked under FDR or ABR and no CPIN or CPINxxxx DD is present, the default is

```
COMPAKT FROMDD=TAPEX, ENQ=RESERVE, VTOC=NOCHANGE
```

When CPK is invoked under FDR or ABR, and a CPIN or CPINxxxx DD is specified, the above operands cannot be overridden; if the input does not include a COMPAKT command, then the default is SIMULATE.

**MINOR  
COMMANDS**

Minor commands must be placed after a major command, and may be coded as often as required. The following minor commands are supported:

- SELECT** — This command may be used to identify a data set or group of data sets which require special handling by COMPAKTOR.
- SEQUENCE** — This command may be used to define the starting position of a set of data sets to be placed in a prescribed sequence.
- ENDSEQ** — This command must be used if a SEQUENCE command was specified. It denotes the end of a sequenced set. One or more SELECT DSN= commands must appear between the SEQUENCE and ENDSEQ commands.

When SELECT DSN=filter commands are used, they must follow any SEQUENCE, ENDSEQ and SELECT DSN= commands specifying fully-qualified names.

**FDR  
COMMANDS**

In addition to the COMPAKTOR commands, CPK will accept the FDR DUMP control statement. When running FDR under COMPAKTOR by specifying COMPAKT DUMP=YES, you may want to specify options for FDR to use during the dump. If so, include a DUMP TYPE=FDR command preceding the COMPAKTOR commands. This command, if used, must be the first command in the SYSIN data set, and must be contained on one record (i.e.: must not be continued). It must specify TYPE=FDR. Some of the other operands that are valid are COMPRESS=, MAXERR=, DSNENQ=, DATA=USED, and LBPZERO=VALID.

These operands are described in [Section 10.04](#).

```
EXAMPLE:      DUMP          TYPE=FDR, DSNENQ=USE
              COMPAKT      DUMP=YES
```

**DEFAULTS**

The defaults for certain operands, such as ACTMESS=, LINECNT=, OVERRIDE=, SIZEKEEP=, NOSECOND=, and HILIGHT= may be permanently changed in the FDR option table. These may be updated via the FDR/ABR ISPF support ([See Section 92](#)) or by program FDRZAPOP ([See Section 91](#)). Defaults shown in the descriptions which follow are the defaults distributed with COMPAKTOR.

40.07 MAP COMMAND

MAP *ENQ=YES / NO / RESERVE*  
*,FROMDD=ddname*  
*,HIGHLIGHT=YES*  
*NO*  
*,LINECNT=nn*  
*,MAPFORMAT=NEW / OLD*  
*,MAPS=EXTENTS / FREESPC / SUMMARY*  
*,VOL=(volser,volser,...)*

**MAP COMMAND** This command should be used when you desire to map a disk pack, either residing on a direct-access device or on an FDR backup. Note that full VTOC error checking will still be performed. The input device, whether disk pack or FDR backup, is never altered in any way.

<b>OPERANDS</b>	<b>ENQ=</b>	<p><b>YES</b> — specifies that CPK will enqueue the VTOC for the duration of the operation.</p> <p><b>NO</b> — specifies that CPK will not enqueue the VTOC.</p> <p><b>RESERVE</b> — specifies that CPK will issue a RESERVE against the VTOC on the volume being COMPAKted or mapped.</p> <p>CAUTION: If ENQ=YES is coded on a shared DASD system or if ENQ=NO is coded, CPK may lose data sets or go into a loop if data sets are allocated or scratched during COMPAKtion.</p> <p>Default is RESERVE.</p>
	<b>FROMDD=</b>	<p>Specifies the dd-name of the DD statement pointing to the input device. In order to map a FDR backup residing on a disk backup file, you must specify FROMDD=TAPEX, otherwise, CPK will map the volume on which the backup resides instead.</p> <p>Default is DISK1.</p>
	<b>HIGHLIGHT=HI</b>	<p><b>YES</b> — specifies that CPK will highlight certain data on the maps in order to make it stand out. This is done by overprinting the line three times.</p> <p><b>NO</b> — specifies no highlighting.</p> <p>NOTE: Under TSO or on a laser printer, we suggest you always specify NO highlighting.</p> <p>Default is YES unless overridden in the FDR option table (<a href="#">See Section 91 or 92</a>).</p>
	<b>LINECNT=LC</b>	<p>Specifies the number of lines COMPAKTOR is to print per page. LINECNT can specify a value of 10 to 999.</p> <p>Default is 58 unless overridden in the FDR option table (<a href="#">See Section 91 or 92</a>).</p>

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## 40.07 CONTINUED . . .

- MAPFORMAT=** **NEW** — specifies that a new format for the “before” and “after” maps will be used, which supports 5-digit cylinder numbers to accommodate very large disks such as the 3390-9.
- OLD** — specifies that the old map format, with 4-digit cylinder numbers and 5-digit relative track numbers, is to be used. If MAPFORMAT=OLD is specified for the large disks, inaccurate cylinder and track numbers may be printed.
- Default is NEW for disks with over 65535 tracks (such as the 3390-9) and OLD for all other disks.
- MAPS=** Specifies which maps are to be printed and the type of map.
- EXTENTS** — specifies that a full track/extent map plus a summary report is desired.
- FREESPC** — specifies that CPK is to print only free areas.
- SUMMARY** — specifies that only a summary report will be produced.
- Default is EXTENTS
- VOL=** Specifies the disk volume serial(s) which COMPAKTOR is to dynamically allocate and map. FROMDD= and VOL= may not both be specified. If VOL= is specified, there must be no DISK1 DD statement in the COMPAKTOR JCL. A single volume serial may be specified as VOL=volser or multiple volume serials may be specified:
- 1) A list of volume serials may be given, enclosed in parentheses, up to a maximum of 20, e.g.,
 

```
VOL=( TS0001, TS0002, TS0003)
```

COMPAKTOR will map the volumes in the order specified.
  - 2) A volume group may be specified by placing an asterisk at the end of the volser prefix, e.g.,
 

```
VOL=TSO*
```

Within that group, COMPAKTOR will map the volumes in the order that their UCBs exist in the MVS system.
  - 3) The two may be combined, e.g.,
 

```
VOL=( TSO*, PROD*, ABC001)
```

Each group will be mapped in the order described above before going on to the next group or volume.
  - 4) All online disk volumes may be selected by:
 

```
VOL=*
```

COMPAKTOR will map the volumes in the order that their UCBs exist in the MVS system.
- COMPAKTOR will not check for duplicate volume serials, so volumes selected more than once will be mapped more than once.

## 40.08 COMPAKT AND SIMULATE COMMANDS

This page lists the operands available for FAST COMPAKTion (TYPE=FASTCPK), a COMPAKT-in-place that does not use a backup.

COMPAKT CPK SIMULATE SIM	<b>TYPE=</b> <u>FASTCPK</u> / <b>FCPK</b>	<b>,MAPFORMAT=</b> <u>OLD</u> / <b>NEW</b>
	<b>,ACTMESS=</b> <u>YES</u> / <b>NO</b>	<b>,MAXERR=</b> <i>nnn</i>
	<b>,BADCHAIN=</b> <u>YES</u> / <b>IGNORE</b>	<b>,MINRLSE=</b> <i>nnnn</i>
	<b>,CONFMESS=</b> <u>YES</u> / <b>NO</b>	<b>,NOSECOND=</b> <u>RLSE</u> / <b>NORLSE</b>
	<b>,CPKFRAGI=</b> <i>nnn</i>	<b>,OBJECT=</b> <u>MAXFREE</u> / <b>MINEXTS</b>
	<b>,CPKFREEEX=</b> <i>nn</i>	<b>,OVERRIDE=</b> <u>YES</u> / <b>NO</b>
	<b>,CPKDSNMX=</b> <i>nn</i>	<b>,PORLSE=</b>
	<b>,CPKMULTX=</b> <i>nn</i>	<b>,PSRLSE=</b> <u>ALL</u> / <b>ROUND</b> / <b>TRK</b>
	<b>,DATA=</b> <u>ALL</u> / <b>USED</b>	<b>,PRINT=</b> <u>ALL</u>
	<b>,DSNENQ=</b> <u>NONE</u> / <b>TEST</b> / <b>USE</b>	<b>,SELTERR=</b> <u>NO</u>
	<b>,ENQ=</b> <u>YES</u> / <b>NO</b> / <b>RESERVE</b>	<b>,SIZEKEEP=(</b> <i>size,pct,mx</i> <b>)</b>
	<b>,EXTENTS=</b> <u>KEEP</u>	<b>,SORT=</b> <u>LREF</u> / <b>SIZE</b>
	<b>,FIT=</b> <u>VTOC</u> / <b>BEST</b> / <i>nn</i>	<b>,STORGRP=(</b> <i>storgrp,...</i> <b>)</b>
	<b>,HIGHLIGHT=</b> <u>YES</u> / <b>NO</b>	<b>,VOL=(</b> <i>volser,volser,...</i> <b>)</b>
	<b>,LBPZERO=</b> <u>VALID</u> / <b>INVALID</b>	<b>,VSRLSE=</b> <u>ALL</u> / <b>NO</b>
	<b>,LINECNT=</b> <i>nn</i>	<b>,VSAMEXT=</b> <u>KEEP</u> / <b>MERGE</b>
	<b>,LOG=</b> <u>YES</u> / <b>NO</b>	<b>,%FREE=</b> <i>nn</i>
	<b>,MAPS=(</b> <u>ALL</u> / <b>AFT</b> / <b>SUMMARY</b>	<b>,%PSFREE=</b> <i>nn</i>
	<b>,EXTENTS</b> / <b>,FREESPC)</b>	<b>,%POFFREE=</b> <i>nn</i>
	<b>,LRDAYS=</b> <i>nnn</i>	<b>,%VSFREE=</b> <i>nn</i>

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## 40.08 CONTINUED . . .

This page lists the operands available for COMPAKTOR RELEASE (TYPE=RLSE), the fast space release option.

COMPAKT  
CPK  
SIMULATE  
SIM

TYPE= <u>RELEASE</u> / <u>RLSE</u>	MINRLSE=nnnn
,ACTMESS=YES / <u>NO</u>	,NOSECOND= <u>RLSE</u> / <u>NORLSE</u>
,BADCHAIN= <u>YES</u> / <u>IGNORE</u>	,OVERRIDE=YES / <u>NO</u>
,CONFMESS=YES / <u>NO</u>	,PORLSE=
,DSNENQ=NONE / <u>TEST</u> / <u>USE</u>	,PSRLSE=ALL / <u>ROUND</u> / <u>TRK</u>
,ENQ=YES / <u>NO</u> / <u>RESERVE</u>	,PRINT=ALL
,HIGHLIGHT=YES / <u>NO</u>	,SELTERR=NO
,LBPZERO=VALID / <u>INVALID</u>	,STORGRP=(storgrp,...)
,LINECNT=nn	,VOL=(volser,volser,...)
,LOG=YES / <u>NO</u>	,VSRLSE=ALL / <u>NO</u>
,MAPFORMAT=OLD / <u>NEW</u>	,%FREE=nn
,MAPS=(ALL / AFT / <u>SUMMARY</u>	,%PSFREE=nn
,EXTENTS / ,FREESPC)	,%POFREE=nn
,MAXERR=nnn	,%VSFREE=nn
,	

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## 40.08 CONTINUED . . .

This page lists operands available for a COMPAKT-from-backup (TYPE=COMPAKT).

COMPAKT CPK SIMULATE SIM	<b>TYPE=</b> <u>COMPAKT</u> / <b>CPK</b>	<b>,OBJECT=</b> <u>MAXFREE</u> / <b>MINEXTS</b>
	<b>,ACTMESS=</b> YES / <b>NO</b>	<b>,OVERRIDE=</b> YES / <b>NO</b>
	<b>,BADCHAIN=</b> <u>YES</u> / <b>IGNORE</b>	<b>,PORLSE=</b>
	<b>,CONFMESS=</b> <u>YES</u> / <b>NO</b>	<b>,PSRLSE=</b> ALL / <b>ROUND</b> / <b>TRK</b>
	<b>,CPKFRAGI=</b> nnn	<b>,PRINT=</b> ALL
	<b>,CPKFREEEX=</b> nn	<b>,SELTERR=</b> NO
	<b>,CPKDSNMX=</b> nn	<b>,SIZEKEEP=</b> (size,pct,mx)
	<b>,CPKMULTX=</b> nn	<b>,SMSPROT=</b> <u>ALL</u> / <b>NONE</b>
	<b>,CPYVOLID=</b> <u>YES</u> / <b>NO</b>	<b>,SORT=</b> LREF / <u>SIZE</u>
	<b>,DEVCYL=</b> nnnnn	<b>,TEMPS=</b> KEEP
	<b>,DUMP=</b> YES / <b>NO</b>	<b>,TODD=</b> ddname
	<b>,ENQ=</b> YES / <b>NO</b> / <u>RESERVE</u>	<b>,VOL=</b> volser
	<b>,EXTENTS=</b> KEEP	<b>,VSRLSE=</b> ALL / <u>NO</u>
	<b>,FIT=</b> VTOC / <b>BEST</b> / <b>nn</b>	<b>,VSAMEXT=</b> KEEP / <u>MERGE</u>
	<b>,FROMDD=</b> ddname	<b>,VTOC=</b> <u>NOCHANGE</u> / <b>COMPAKT</b>
	<b>,HIGHLIGHT=</b> YES / <b>NO</b>	<b>,%FREE=</b> nn
	<b>,LBPZERO=</b> \$LBVALID / <b>INVALID</b>	<b>,%PSFREE=</b> nn
	<b>,LINECNT=</b> nn	<b>,%POFFREE=</b> nn
	<b>,LOG=</b> YES / <u>NO</u>	<b>,%VSFREE=</b> nn
	<b>,LRDAYS=</b> nnn	<b>,%FOLD=</b> pct
	<b>,EXTENTS</b> / <b>,FREESPC</b> )	<b>,MAPS=</b> ( <u>ALL</u> / <b>AFT</b> / <b>SUMMARY</b>
	<b>,MAPFORMAT=</b> NEW / <b>OLD</b>	
	<b>,MAXERR=</b> nnn	
	<b>,MINRLSE=</b> nnnn	
	<b>,NOSECOND=</b> RLSE / <b>NORLSE</b>	

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**COMPAKT COMMAND** The COMPAKT or CPK command invokes either a full COMPAKTion of one or more disk volumes, or causes just release of free space in data sets, depending on the TYPE= operand.

**SIMULATE COMMAND** The SIMULATE or SIM command invokes a simulation of a real COMPAKTion, so that you can see what the results would be if the COMPAKTion was actually done. The before and after maps and summary, if requested, will be printed. TYPE=RLSE is also supported to simulate space release. Note that a SIMULATE TYPE=COMPAKT will not test for active data sets so when COMPAKTing an active volume the simulation results may differ from the actual results. However, TYPE=RLSE and TYPE=FASTCPK will test for active data sets. Simulation may be done against the actual disk pack, or, for TYPE=COMPAKT, against an FDR full-volume backup data set.

**OPERANDS**    **TYPE=**                    **FASTCPK** or **FCPK** — specifies that COMPAKTOR is to perform a Fast COMPAKTion-in-place on one or more disk volumes. No FDR backup is needed or taken. TYPE=FASTCPK assumes that the volume may be active and assumes ACTMESS=NO, CONFMESS=NO, TEMPS=KEEP and DSNENQ=USE (TEST for SIMULATE); active data sets will not be moved. Data sets may not be scratched, the VTOC cannot be moved or COMPAKTed, and the VVDS may not be moved.

**RELEASE** or **RLSE** — specifies that COMPAKTOR is to release excess space from PS, PO and/or VSAM data sets on one or more disk volumes. No backup is needed or taken. At least one operand requesting space release must be specified on the COMPAKT/SIMULATE statement or on a SELECT statement. TYPE=RLSE assumes that the volume may be active and assumes ACTMESS=NO, CONFMESS=NO, DSNENQ=USE (TEST for SIMULATE); space will not be released from active data sets. No data sets will be moved or scratched.

**COMPAKT** or **CPK** — specifies that COMPAKTOR is to perform a COMPAKTion on one disk volume, from a FDR full-volume backup. If DUMP=YES is specified, COMPAKTOR will invoke FDR to take that backup and then read it back. Otherwise, the backup must have been taken previously. TYPE=COMPAKT assumes that the volume is not active and that all data sets are movable; [see Section 40.24](#) for COMPAKTion of active volumes with TYPE=COMPAKT. You must use TYPE=COMPAKT instead of FASTCPK if the output volume is different from the input volume, if data sets are to be scratched, or if the VTOC is to be moved or expanded/contracted.

   Default is TYPE=COMPAKT

**ACTMESS=**                    **YES** — specifies that CPK will notify the operator if the volume being COMPAKTed is currently active (has more than one open DCB). The operator must then reply to the FDRW81 message prior to CPK COMPAKTing the volume.

**NO** — specifies that CPK will suppress the active message. [See Section 40.24](#) for details on COMPAKTing an active volume.

   Default is YES for TYPE=COMPAKT unless overridden in the FDR option table ([See Section 91 or 92](#)). Default is NO for TYPE=RLSE and TYPE=FASTCPK. ACTMESS is ignored for SIMULATE.

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## 40.08 CONTINUED . . .

<b>BADCHAIN=</b>	<p><b>YES</b> — specifies that when CPK detects a Format 3 DSCB (for a dataset with more than 3 extents) which is NOT chained to another DSCB, msg CPK516 is issued and it will not attempt to COMPAKT or release the volume.</p> <p><b>IGNORE</b> — specifies that CPK is to convert unchained Format 3 DSCBs into Format 0 (free) DSCBs. Message CPK516 will still occur, but if no other errors occur, this will result in a valid VTOC.</p> <p>Default is YES.</p> <p><b>WARNING: Message CPK516 may occur for conditions other than unchained F3 DSCBs, although that is the most common cause. DO NOT specify BADCHAIN=IGNORE until you have verified that all DSCBs identified in CPK516 messages are F3 DSCBs that are not themselves chained to another F3 DSCB (their last 5 bytes must be zero).</b></p>
<b>CONFMESS=</b>	<p><b>YES</b> — specifies that CPK ask the operator, via a WTOR, if the COMPAKTion can proceed. The operator must reply YES to the FDRW80 message to begin the COMPAKTion.</p> <p><b>NO</b> — specifies that CPK begin the COMPAKTion without asking the operator for confirmation.</p> <p>Default is YES for TYPE=COMPAKT and NO for TYPE=RLSE and TYPE=FASTCPK. CONFMESS is ignored for SIMULATE.</p>
<b>CPKFRAGI=</b> <b>CPKFREEEX=</b> <b>CPKDSNMX=</b> <b>CPKMULTX=</b>	<p>These operands define an amount of fragmentation that the user considers acceptable. If none of these operands are specified, COMPAKTion will be done unconditionally. If one or more of these operands are specified and none of the limits that they request are exceeded, COMPAKTion will not be performed. These operands can only be specified with the TYPE=COMPAKT,DUMP=YES or TYPE=FASTCPK.</p> <p><b>CPKFRAGI</b> — specifies the largest fragmentation index that a volume may have before it is to be COMPAKTed. The index is calculated from an IBM formula and is discussed in <a href="#">Section 40.18</a>. A decimal point is assumed in front of the value, e.g., CPKFRAGI=2, CPKFRAGI=20 and CPKFRAGI=200 all refer to an index of .200.</p> <p><b>CPKFREEEX</b> — specifies the maximum number of free space areas that can exist before the volume is to be COMPAKTed.</p> <p><b>CPKDSNMX</b> — specifies the maximum number of data sets that can have more than one extent before the volume will be COMPAKTed.</p> <p><b>CPKMULTX</b> — specifies the maximum number of extents that are not the first extent of a data set that can exist before the volume will be COMPAKTed.</p> <p>The <b>MINRLSE</b> operand, documented later in this section, is treated as a fifth conditional COMPAKTion value.</p> <p>EX: CPK DUMP=YES, CPKFREEEX=10, CPKDSNMX=5, CPKFRAGI =250          If the volume does not exceed 10 free space areas, 5 multi-extent data sets, or a fragmentation index of .250, CPK will bypass the COMPAKTion of the volume. However, the volume will always be dumped if TYPE=COMPAKT,DUMP=YES is specified.</p>
<b>CPYVOLID=</b>	<b>NO</b> — specifies that the volume serial number of the target volume (the volume
<b>CPY</b>	<p>specified in the TODD= parameter), is to be retained. This applies only to TYPE=COMPAKT when the target volume is not the original volume.</p> <p><b>YES</b> — the target volume receives the serial number of the dumped volume. The default is YES.</p>

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## 40.08 CONTINUED . . .

**DATA=** **ALL** — specifies that all allocated tracks of PS, PO and ICF VSAM data sets will be moved if the data set is moved by a Fast COMPAKTion, except for tracks that are released by COMPAKTOR.

**USED** — specifies that only the used tracks of PS, PO and ICF VSAM data sets will be moved by a Fast COMPAKTion (TYPE=FASTCPK). This will improve COMPAKTOR run time and should be used unless there are data sets on the volume whose last block pointer or HI-USED-RBA is unreliable.

Default is USED.

For COMPAKT-from-backup (TYPE=COMPAKT with DUMP=YES), DATA=USED is specified on the DUMP TYPE=FDR statement; the default is ALL.

**DEV CYL=** Specifies that COMPAKTOR is to operate as though the output device had the specified number of cylinders. This applies only to SIMULATE TYPE=COMPAKT.

The proper values are:

10017 for 3390-9	2655 for 3380-K(triple density)
3339 for 3390-3(triple density)	1770 for 3380-E(double density)
2226 for 3390-2(double density)	885 for 3380 (single density)
1113 for 3390-1(single density)	1440 for 9340-1
	2156 for 9340-2

The purpose of DEV CYL is to enable you to simulate conversion of any density disk to any other density disk of the same type when the target density disk is not actually installed on your system. This can be used for planning before the new drives are installed, or for preparing for a disaster recovery site which does not have the same density drives as you do. If you have the proper density drives installed, the TODD= parameter should be used instead of DEV CYL= to be sure that the proper device size is used.

**DEV CYL= should not be specified during the actual COMPAKTion, since the size will be picked up from the VTOC of the output volume. In V5.2 and above, COMPAKTOR will automatically support VM mini-disks and other non-IBM disks whose size does not match that of a real IBM disk as shown above.**

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## 40.08 CONTINUED . . .

**DSNENQ=**

Specifies that COMPAKTOR is to enqueue all of the data sets on the volume being processed, issuing an exclusive enqueue with a major name of 'SYSDSN^' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, COMPAKTOR will issue a warning message for the data set and will consider it to be an active data set (the data set will not be moved and will not have any space released). Data sets not being moved or released will not be enqueued (for Fast COMPAKTion they may be enqueued briefly and dequeued).

DSNENQ= is independent of ENQ= which prevents new data sets from being allocated or old data sets from being scratched.

DSNENQ= can be used only if TYPE=RLSE or TYPE=FASTCPK has been specified.

**TEST** — The data sets will only be tested to see if they are active at the time the COMPAKTion starts. The data sets will not be enqueued.

**USE** — The data sets will be enqueued for the duration of the COMPAKTion of the volume. If they are enqueued to another task, they will be considered active.

**NONE** — No data set ENQ will be issued; active data sets will not be detected and may be moved or released.

**NOTE:** If the data set is specified in a DD statement in the CPK job with DISP=SHR, the scheduler enqueue for the data set will be changed to EXCLUSIVE (DISP=OLD) if you specify TEST or USE.

Default is USE for COMPAKT and NONE for SIMULATE, but only for the TYPE=FASTCPK and TYPE=RLSE options. For COMPAKT TYPE=COMPAKT with DUMP=YES, the DSNENQ= option on the FDR DUMP statement **must be used** to detect active data sets.

**CAUTION:** This option should not be used on shared DASD unless a cross-system enqueue facility is available and the SYSDSN QNAME is broadcast across systems. Without this capability, COMPAKTOR can only determine which data sets are active on the system it is running on.

**DUMP=  
D**

**YES** — specifies that COMPAKTOR must invoke FDR to dump a disk pack prior to COMPAKTion. The dump is always from the DISK1 DD statement to the TAPE1 statement; this is not affected by the FROMDD or TODD operands. Note that both DD statements are required if DUMP=YES is coded. However, DISK1 may be omitted if VOL= is specified.

**NO** — CPK is to restore from an existing FDR backup tape.

**NOTE:** DUMP= applies only to TYPE=COMPAKT and is ignored for SIMULATE.

The default is NO.

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## 40.08 CONTINUED . . .

<b>ENQ=</b>	<p><b>YES</b> — specifies that CPK will enqueue the VTOC for the duration of the operation.</p> <p><b>NO</b> — specifies that CPK will not enqueue the VTOC.</p> <p><b>RESERVE</b> — specifies that CPK will issue a RESERVE against the VTOC on the volume being COMPAKTed.</p> <p>NOTE: Additional information is available on cross system ENQ consideration and MIM from LEGENT, in the FDR Installation Control Library (ICL) under the member name ENQ.</p> <p>CAUTION: If ENQ=YES is coded on a shared DASD system or if ENQ=NO is coded, CPK may lose data sets or go into a loop if data sets are allocated or scratched during COMPAKTion.</p> <p>Default is RESERVE.</p>
<b>EXTENTS=</b> <b>E</b>	<p><b>KEEP</b> — specifies that all multi-extent non-VSAM data sets are to retain the number and size of their extents.</p> <p>If EXTENTS= is specified and PSRLSE and/or PORLSE is also specified, then the unused space will be freed down to the requested boundary, but the extents occupied by the remaining used portion of the data set will not be merged.</p> <p>If omitted, COMPAKTOR automatically attempts to reduce multi-extent data sets down to a single extent. On TYPE=RLSE, all extents that are not released retain their locations.</p>
<b>FIT=</b>	<p>Controls how COMPAKTOR selects a location for datasets that it is free to position (that are not unmovable and don't have a matching SELECT statement with POS=):</p> <p><b>VTOC</b> — datasets will be positioned on either side of the VTOC, in the closest "hole" of free space that is as large or larger than the dataset.</p> <p><b>BEST</b> — datasets will be positioned into the "hole" of free space whose size most closely matches the size of the dataset, which will result in fewer free space areas.</p> <p><b>nn</b> — FIT=BEST processing will be used as long as there are at least "nn" free space holes to the left or right of the VTOC; once the number of holes has been reduced below "nn" on either side, then FIT=VTOC processing will be used.</p> <p>Default is FIT=10. However, FIT=BEST is forced if %FOLD= or TYPE=FASTCPK was specified.</p>
<b>FROMDD=</b> <b>FDD</b>	<p>Specifies the dd-name of the DD statement pointing to the input data set which must be an FDR backup file on tape or disk for COMPAKT TYPE=COMPAKT or the target disk pack for TYPE=FASTCPK or TYPE=RLSE. On SIMULATE TYPE=COMPAKT, if FROMDD specifies a dd-name of TAPEX, CPK will assume that COMPAKTion from an FDR backup file is to be simulated; if the dd-name is not TAPEX, then the DD statement points to a disk volume whose COMPAKTion will be simulated.</p> <p>Default is TAPE1 on COMPAKT TYPE=COMPAKT, DISK1 in all other cases.</p>

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## 40.08 CONTINUED . . .

<b>HIGHLIGHT=HI</b>	<p><b>YES</b> — specifies that CPK will highlight certain data on the maps in order to make it stand out. This is done by overprinting the line three times.</p> <p><b>NO</b> — specifies no highlighting.</p> <p>NOTE: Under TSO or on a laser printer, we suggest you always specify NO highlighting.</p> <p>Default is YES unless HIGHLIGHT=NO is set in the FDR option table (<a href="#">See Section 91 or 92</a>).</p>
<b>LBPZERO=</b>	<p><b>VALID</b> — Specifies that CPK is to consider PS and PO data sets with a last block pointer (DS1LSTAR) of zero and ICF VSAM components with a HI-USED-RBA of zero to be valid for release. A pointer of zero usually indicates an empty data set. However certain data sets may have zeroes and not be empty (ex: SYS1.DUMP). Care must be taken with these data sets. CPK will treat the data set as if it had one track used.</p> <p><b>INVALID</b> — CPK will not release space from such data sets.</p> <p>Default is invalid unless LBPZERO=VALID is set in the FDR option table (<a href="#">See Section 91 or 92</a>).</p>
<b>LINECNT=LC</b>	<p>Specifies the number of lines COMPAKTOR is to print per page. LINECNT can specify a value of 10 to 999.</p> <p>Default is 58 lines to a page unless overridden in the FDR option table (<a href="#">See Section 91 or 92</a>).</p>
<b>LOG=</b>	<p><b>YES</b> — specifies that CPK will issue console operator messages (FDRW82) indicating when various parts of it's operation begin and end. This may aid the operator in determining whether a COMPAKTOR operation has completed successfully.</p> <p><b>NO</b> — specifies that no FDRW82 console messages will be issued.</p> <p>Default is NO.</p>
<b>LRDAYS=</b>	<p>Is valid only when SORT=LREF is also specified. Datasets which have been referenced within the last "nn" days will be sorted by last reference date for positioning close to the VTOC (see SORT=). Datasets referenced more than "nn" days ago will be placed outside those datasets and will be sorted strictly by size. "nn" may be from 1 to 255.</p> <p>Default is 10.</p>
<b>MAPFORMAT=</b>	<p><b>NEW</b> — specifies that a new format for the "before" and "after" maps will be used, which supports 5-digit cylinder numbers to accommodate very large disks such as the 3390-9.</p> <p><b>OLD</b> — specifies that the old map format, with 4-digit cylinder numbers and 5-digit relative track numbers, is to be used. If MAPFORMAT=OLD is specified for the large disks, inaccurate cylinder and track numbers may be printed.</p> <p>Default is NEW for disks with over 65535 tracks (such as the 3390-9) and OLD for all other disks.</p>
<b>MAPS=</b>	<p>Specifies which maps are to be printed and the type of map.</p> <p><b>ALL</b>- specifies that both the before and after maps are to be printed.</p> <p><b>AFT</b>- specifies that only the 'after' COMPAKTion/simulation map is to be printed.</p> <p><b>EXTENTS</b>- specifies that a full track/extent map is desired.</p> <p><b>FREESPC</b>- specifies that CPK is to print only free areas.</p> <p><b>SUMMARY</b>- specifies that only a summary report will be produced.</p> <p>Default is ALL,EXTENTS except for TYPE=RLSE where the default is SUMMARY.</p>
<b>MAXERR=</b>	<p>Specifies the maximum number of tape or disk I/O errors which are allowed before the COMPAKTion is abnormally terminated. Error counts are maintained separately for disk and tape, but this operand specifies the maximum value for those counts. It may have a value from 1 (terminate after first error) to 255.</p> <p>The default is 20.</p>

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## 40.08 CONTINUED . . .

<b>MINRLSE=</b>	<p>Specifies the minimum number of tracks which COMPAKTOR must be releasing from a volume before the space release or COMPAKTion will proceed.</p> <p>For FAST COMPAKTion (TYPE=FASTCPK) and COMPAKT-from-backup (TYPE=COMPACT), MINRLSE works in conjunction with the other conditional COMPAKTion operands (CPKFRAGI, CPKFREEEX, CPKDSNMX, and CPKMULTX, documented earlier); if any of the 5 are specified, the COMPAKTion of a given volume will be done only if at least one of them is exceeded. For TYPE=RLSE, MINRLSE is the only conditional operand, the volume will not be modified unless at least that many tracks are released. The default is 0 (zero).</p>
<b>NOSECOND=</b>	<p>Specifies how COMPAKTOR will treat PS, PO and ICF VSAM datasets which do not have any secondary allocation quantity defined.</p> <p><b>NORLSE</b> — do not release space from any dataset which does not have a secondary allocation.</p> <p><b>RLSE</b> — datasets with no secondary allocation are candidates for space release.</p> <p>The default is RLSE unless overridden in the FDR option table (<a href="#">See Section 91 or 92</a>).</p>
<b>OBJECT=</b> <b>O</b>	<p>Specifies your primary reorganization objective.</p> <p><b>MAXFREE</b> if you wish to minimize the number of free space extents on the reorganized volume.</p> <p><b>MINEXTS</b> if your objective is to have as few multi-extent data sets as possible. The default is MAXFREE.</p> <p>A further explanation of this parameter can be found in <a href="#">Section 40.17</a> of this manual.</p>
<b>OVERRIDE=</b>	<p><b>YES</b> — specifies that CPK will honor SELECT control statements to move or release data sets specified in the unmovable table or which were flagged as “active” by the FDR DSNENQ= option.</p> <p><b>NO</b> — specifies that CPK will not move or release data sets specified in the unmovable table or active dataset table.</p> <p>WARNING: This option should be used with care, since it may allow datasets that are in use to be moved, causing system or application failures. <a href="#">See Section 40.24</a> for details on COMPAKTing active volumes.</p> <p>Default is NO unless OVERRIDE=YES is specified in the COMPAKTOR unmovable table (<a href="#">Section 91 or 92</a>).</p>
<b>PSRLSE=</b> <b>PSR</b>	<p>Specifies that unused tracks within physical sequential (DSORG=PS) data sets are to be freed.</p> <p>CPK uses the last block pointer (DS1LSTAR) field in the VTOC to determine how many tracks of the data set are used. If this field is all zeroes, CPK will not free any space from the data set, unless LBPZERO=VALID is specified. Some additional tracks may be retained as free space for expansion if %FREE= or %PSFREE= is coded.</p> <p><b>ALL</b> — track-allocated data sets, all unused tracks are to be freed. Cylinder-allocated data sets, only unused cylinders are freed.</p> <p><b>ROUND</b> — only unused extents are to be freed.</p> <p><b>TRK</b> — all of the unused tracks are to be freed even if the data sets are cylinder allocated.</p> <p>NOTE: If CPK, using the TRK option, releases a cylinder-allocated data set past its cylinder boundary, CPK will reset the cylinder indication in the extent fields of the DSCB. However, the secondary allocation type will remain the same as before the release. (The secondary allocation type is shown in the SPACE ALLOC field in the CPK map.)</p> <p>If omitted, all PS data sets retain their original number of tracks unless they are affected by the RLSE= operand of a SELECT statement.</p>

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## 40.08 CONTINUED . . .

<b>PORLSE= POR</b>	This parameter is identical to the PSRLSE parameter, but applies only to partitioned data sets (DSORG=PO). %FREE= or %POFREE= may cause some free space to be retained for expansion.
<b>PRINT=ALL</b>	Specifies that CPK is to print a list of the unmovable and active data sets.
<b>SELTERR=</b>	<b>NO</b> — specifies that CPK will not give an error condition if a SELECT DSN statement is given which does not reference a data set on the volume.  Default is that CPK willabend if a SELECT DSN statement references a data set not on the volume unless SELTERR=NO is set in the FDR option table ( <a href="#">See Section 91 or 92</a> ).
<b>SIZEKEEP=</b>	<p>This is a performance option which reduces the number and size of the data sets to be moved by COMPAKTOR while still providing most of the free space consolidation benefits of COMPAKTion. Since data sets which are not moved will not have their tracks restored and will not have their update flags set, this will significantly reduce COMPAKTOR elapsed time and reduce the impact on later ABR incremental backups.</p> <p>The first parameter “size” specifies that COMPAKTOR is to search for groups of allocated tracks greater than or equal to this size; a group is a contiguous set of tracks, belonging to one or more data sets, with a free space extent on either side of it. These groups will be made unmovable. “size” may range from 0 to 999999.</p> <p>The second parameter “pct” specifies a percentage reduction in the number of free space areas that COMPAKTOR must achieve (e.g., 50 specifies that CPK must reduce the number of free space areas on the volume by at least 50 percent). If COMPAKTOR cannot achieve a pct% reduction in the free space areas while keeping those groups in their current locations, it will make some of the selected groups movable (the smaller groups in the list) and try again, repeating this until the desired pct% reduction is achieved or until all groups have been made movable. “pct” may range from 1 to 100.</p> <p>The third parameter “mx” is the maximum number of extents that a multi-extent data set may have to be included in SIZEKEEP processing. Data sets with more than “mx” extents will not be considered part of any SIZEKEEP track group, and COMPAKTOR will try to combine their extents. If some, but not all, of the extents of a data set with “mx” or fewer extents are part of SIZEKEEP track groups, COMPAKTOR may move the other extents but will not combine them. “mx” may range from 1 to 60 (data sets with over 60 extents will never be included in SIZEKEEP groups).</p> <p>If a data set which would be made unmovable by SIZEKEEP is positioned by a SELECT statement with POS=, the SELECT will be honored. Space release is honored for SIZEKEEP datasets. SIZEKEEP is honored only for COMPAKTion in-place (TYPE=FASTCPK or COMPAKT TYPE=COMPAKT or COMPAKTOR under FDR or ABR).</p> <p>Specifying SIZEKEEP=0 disables this option for a COMPAKT-from-backup, but Fast COMPAKTion may still apply it to groups over 100 tracks as long as it can reduce the volume to 1 or 2 free areas.</p> <p>The default is (100, 90, 5), 100 tracks or more, 90% reduction in free areas, data sets over 5 extents are excluded. These defaults can be overridden in the FDR/ABR Global Option Table (<a href="#">See Section 91 or 92</a>). The parenthesis can be omitted if only “size” is specified.</p>

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## 40.08 CONTINUED . . .

**SMSPROT=** **ALL** — specifies that CPK will force CPYVOLID=YES when the input volume has the SMS-managed indicator in the VTOC, and will enforce the rule that a SMS-managed volume can only be restored to a volume whose UCB indicates SMS-management, and that a non-SMS volume must be restored to a non-SMS volume. This applies only to TYPE=COMPAKT when the target volume is not the original volume.

**NONE** — bypasses the above SMS checks, and honors CPYVOLID=NO if specified.

Default is ALL.

**SORT=** **SIZE** — specifies that for datasets that COMPAKTOR is free to move (are not unmovable and do not have a matching SELECT with POS=), it will attempt to position them on either side of the VTOC, sorted in descending size order (largest datasets will be closest to the VTOC).

**LREF** — specifies that datasets that COMPAKTOR is free to position will be positioned on either side of the VTOC, sorted by descending last reference date (the most recently referenced datasets will be closest to the VTOC). Datasets with the same last reference date will be sorted by descending size. Only those datasets whose last reference date is within the number of days specified by LRDAY= (or its default of 10) will be positioned this way; datasets referenced more than LRDAY= ago will be sorted strictly by size and positioned outside the other datasets.

Default is SIZE.

**TEMPS=** **KEEP** — specifies that temporary data sets are to be restored when  
**T** COMPAKTing. This is forced for TYPE=RLSE and TYPE=FASTCPK.

Default is that temporary data sets are automatically deleted under TYPE=COMPAKT.

**TODD=** For COMPAKT TYPE=COMPAKT, specifies the dd-name of the DD statement pointing to the output device: the target disk pack of the COMPAKTion. Must be a direct-access device.

Default is DISK1.

**NOTE:** If DUMP=YES is coded, it is possible to direct CPK to write the compacted disk volume to a different disk than the one that was dumped. The disk pointed to by DISK1 will be dumped to TAPE1 by FDR, but CPK will modify the volume specified by the DD statement pointed to by TODD=; that DD name must NOT start with "DISK\9. This may be used to move a disk volume to a new device and COMPAKT it or reposition the VTOC at the same time.

For SIMULATE TYPE=COMPAKT, may specify the dd-name of a DD statement that points to a direct-access device with the density (i.e. number of cylinders) desired for the target volume. Must be a device of the same basic type as the source volume. For example, if the source volume is a 3380 of any density(single,double, or triple), then TODD may specify a 3380 of any density, but not a 3390. The TODD volume will not be altered in any way by SIMULATE.

The default is that the target device is considered to have the same density (same number of cylinders) as the source volume.

For TYPE=RLSE or TYPE=FASTCPK, this keyword must not be used.

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**STORGRP=** Specifies the names of one or more SMS storage groups. COMPAKTOR will interface to SMS to obtain all of the disk volume serials which are defined to each of the specified storage group names, and will process them as if a VOL= operand were specified for them.

The syntax for STORGRP= is the same as for VOL= as documented below. You may specify a single storage group, a list of groups, and/or a "group" of group names (e.g., STORGRP=DB\*).

STORGRP= can be specified only for Fast COMPAKTion (TYPE=FASTCPK) or space release (TYPE=RLSE). You cannot specify STORGRP= and VOL= in the same run.

**VOL=** Specifies the disk volume serial(s) which COMPAKTOR is to dynamically allocate and process. FROMDD= and VOL= may not both be specified. If VOL= is specified, there must be no DISK1 DD statement in the COMPAKTOR JCL.

For a COMPAKTion from backup (COMPAKT TYPE=COMPAKT or COMPAKT with no TYPE= operand), only one complete volume serial is allowed, e.g.,

VOL=TSO001

For TYPE=FASTCPK or TYPE=RLSE or SIMULATE, multiple volume serials may be specified:

- 1) A list of volume serials may be given, enclosed in parentheses, up to a maximum of 20, e.g.,

VOL=(TSO001,TSO002,TSO003)

COMPAKTOR will process the volumes in the order specified.

- 2) A volume group may be specified by placing an asterisk at the end of the volser prefix, e.g.,

VOL=TSO\*

Within that group, COMPAKTOR will process the volumes in the order that their UCBs exist in the MVS system.

- 3) The two may be combined, e.g.,

VOL=(TSO\*,PROD\*\*,ABC001)

Each group will be processed in the order described above before going on to the next group or volume.

- 4) All online disk volumes may be selected by:

VOL=\*

COMPAKTOR will process the volumes in the order that their UCBs exist in the MVS system.

COMPAKTOR will not check for duplicate volume serials, so volumes selected more than once will be processed more than once.

**VSAMEXT=** **KEEP** — specifies that all multi-extent ICF VSAM components are to retain the number and size of their extents.

**MERGE** — specifies that CPK is to attempt to merge multi-extent VSAM components into a single extent.

If VSAMEXT=KEEP is specified and VSRLSE=ALL is also specified, then the unused space will be freed down to a CA boundary, but the extents occupied by the remaining used portion of the component will not be merged.

The default is MERGE except for a COMPAKT-from-backup with DUMP=NO, where the default is KEEP.

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**VSRLSE=**  
**VSR**

Specifies that unused tracks within ICF VSAM components are to be freed. CPK uses the HI-USED-RBA field in the VVDS record for the component to determine how many tracks of the data set are used. If HI-USED-RBA is zero (which usually means the cluster was never loaded) CPK will not free any space from the data set, unless LBPZERO=VALID is specified.

**ALL** — components of ICF VSAM datasets will be released to the CA (control area) boundary closest to the HI-USED-RBA; additional CAs may be retained as free space for expansion if %FREE= or %VSFREE= is specified. Space will not be released from ICF catalogs, the VVDS, or multi-volume components. [See Section 40.09](#) if space must be released from ICF catalogs.

**NO** — space will not be released from ICF VSAM datasets, unless they are affected by the VSRLSE= operand of a SELECT statement.

The default is NO.

**VTOC=**  
**V**

**COMPAKT** — specifies that the VTOC is to be COMPAKTed, embedded Format 0 DSCBs are to be eliminated. This option must be specified if you wish to change the location or size of the VTOC. This option is invalid on TYPE=RLSE and TYPE=FASTCPK.

**NOCHANGE** — specifies that the DSCB entries are to remain in the same location.

Default is NOCHANGE. [See Section 40.16](#) for further information on why VTOC=NOCHANGE is the default.

**%FREE=**  
**%PSFREE=**  
**%POFREE=**  
**%VSFREE=**

Specifies that for datasets from which CPK is releasing space, this percentage of the data set is to be left as free space after COMPAKTion. PSRLSE=, PORLSE= and/or VSRLSE= must also be specified or else these parameters will be ignored.

CPK will only release space on PS, PO and ICF VSAM data sets and will never increase these data sets in size. For example, if a data set occupies 100 tracks of which 20 tracks are used, %FREE=50 will leave the data set with 40 tracks. Values may be from zero(0) specifying that all of the unused space is to be freed, to 99 which says that 99% of the data set is to be left free.

%FREE applies to PS, PO and ICF VSAM data sets. %PSFREE applies only to PS data sets, %POFREE only to PO data sets, and %VSFREE only to VSAM datasets. If %FREE is coded along with one or more of the others, it will apply to any of the dataset types for which the specific keyword was not coded.

The default for all the keywords is 0.

**%FOLD=**

This is a performance option which specifies that CPK is to reduce its execution time by “folding” the lower part of the pack onto the upper part. “pct” specifies a percentage; CPK will total the tracks allocated to datasets on the volume; only those datasets which reside in the first pct% of that allocated space will be eligible to be moved, and CPK will attempt to move them into free space areas between data sets in the remainder of the volume (past the first pct%). Datasets which are unmovable by normal CPK rules will not be moved. [See Section 40.17](#) for more discussion.

%FOLD is intended only for COMPAKTion in-place (TYPE=COMPAKT, DUMP=YES or under FDR or ABR). Although the entire volume will still be dumped, %FOLD reduces CPK execution time since datasets which are not moved will not have their tracks restored, and CPK will stop reading the backup when all required tracks have been read. Since the datasets made unmovable by %FOLD are at the end of the backup, it will make CPK stop reading the tape much earlier.

“pct” may be from 1 to 100. The default is 100, which makes all datasets eligible to be moved.

## 40.09 SELECT COMMAND

**SELECT S**    *DSN=filter / ALLDSN*  
                   *,DSORG=(xx,xx...)*  
                   *,EXTENTS=KEEP*  
                   *,POS=\$LBVTOC / LVTOC / RVTOC / BEGIN / END / KEEP / [c]ccccchhhh*  
                   *,RLSE=NO / ALL / ROUND / TRK*  
                   *,SCRATCH=YES / NO*  
                   *,VSRLSE=NO / ALL*  
                   *,%FREE=nn*

**SELECT COMMAND**    This command is used to define data sets requiring special treatment by COMPAKTOR. SELECT DSN= is also used to define data sets which are members of a sequenced set (see SEQUENCE command). The presence of SELECT statements does NOT imply that ONLY the named data sets will be moved or released by COMPAKTOR.

The available options are:

- Scratching the named data set(s).
- Positioning of the named data set(s).
- Prevention of multi-extent merges.
- Controlled freeing of unused tracks.

Up to 1000 distinct SELECT commands may be input.

**NOTE: This command replaces the DSNAME and DSGROUP commands used in older releases of COMPAKTOR. For backward compatibility, CPK will continue to support the DSNAME and DSGROUP commands.**

**OPERANDS**    **DSN=**    Specifies a fully-qualified data set name or a filter to be used for generic data set selection, as described in [Section 52.16](#). All data sets on the volume matching this name or filter will be affected by the options on this SELECT.

For ICF VSAM data sets, you must specify component names. CPK does not recognize cluster names.

EXAMPLES:        DSN=USER1. JCL. CNTL  
                       DSN=\* \* LI ST  
                       DSN=PROD\$AR\$AR. \* \*. LI B\*

**NOTE:** The DSG= operand documented in previous versions of COMPAKTOR is still accepted, but the DSN=operand with a generic data set name filter is the preferred way of selecting groups of data sets.

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<b>ALLDSN</b>	<p>Specifies that all of the data sets on the volume will be affected by the options on this SELECT.</p> <p>Either DSN= or ALLDSN must be specified on a SELECT command. If SELECT DSN= commands specifying a fully-qualified data set name are present in the control statement input stream, they must precede all SELECT DSN=filter or ALLDSN commands.</p> <p>If a data set is made unmovable by residing in the COMPAKTOR unmovable table or the list of currently active data sets (DSNENQ=), and a SELECT statement specifying RLSE=, POS=, or SCRATCH= selects it, CPK will abend. If you do not wish to abend, code SELTERR=NO on the CPK control statement. If you wish the data set to be moved, code OVERRIDE=YES on the CPK control statement. <a href="#">See Section 40.24</a> for special considerations on COMPAKTING active volumes.</p>
<b>DSORG=</b>	<p>Specifies that this control statement only applies to data sets with this DSORG(s).</p> <p><b>PS</b> — specifies physical sequential files.</p> <p><b>PO</b> — specifies partitioned files.</p> <p><b>DA</b> — specifies direct-access files.</p> <p><b>EF</b> — specifies VSAM files in an ICF catalog.</p>
<b>EXTENTS=</b> <b>E</b>	<p>Specifies that all extents owned by the named data set are to be retained and not merged into a single extent, although they may be moved (use POS=KEEP to keep all the extents in their current locations).</p> <p>If omitted, multiple extents are merged into a single extent, unless EXTENTS=KEEP is specified in the major command.</p>
<b>POS=</b>	<p>If coded, specifies that positioning is requested for the specified data set(s). Positioning is of two types: relative or absolute.</p> <p>Relative positioning is specified by coding VTOC, LVTOC, RVTOC, BEGIN or END.</p> <p><b>VTOC</b> — specifies that the data set(s) are to be placed as near the VTOC as possible, on either side of it.</p> <p><b>LVTOC</b> — specifies that the data set(s) are to be placed as close to the VTOC as possible, on the left side (lower numbered tracks) of it.</p> <p><b>RVTOC</b> — specifies that the data set(s) are to be placed as close to the VTOC as possible, on the right side (higher numbered tracks) of it.</p> <p><b>BEGIN</b> — the data set(s) is placed as near the beginning of the disk pack as possible.</p> <p><b>END</b> — the data set(s) is placed as close to the end of the disk pack as possible. Absolute positioning is specified by coding KEEP or an address (cccchhhh).</p> <p><b>KEEP</b> — the data set is to retain its original position. If specified, RLSE=, VSRLSE=, %FREE=, and SCRATCH= cannot also be specified.</p> <p><b>[c]cccchhhh</b> — code a decimal cylinder and head address, when you wish to specify an absolute position for the data set. The first 4 digits (or 5 if 9 total digits are given) are the decimal cylinder number and the last 4 are the decimal track number within that cylinder. Both cylinder and track addresses must be relative to zero. An address of all zeroes is invalid. CPK will fail if this address causes the dataset to overlap with an unmovable dataset or another absolute positioned dataset. This option is not valid when DSN=filter or ALLDSN are coded.</p> <p>If POS= is omitted, the position of the data set after COMPAKTion is determined by internal algorithms.</p> <p><a href="#">See Section 40.16</a> for further considerations when positioning data sets.</p> <p>This parameter must be omitted if the SELECT command is part of a sequenced set.</p> <p>This parameter is invalid on TYPE=RLSE.</p>

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## 40.09 CONTINUED . . .

<b>RLSE=</b>	<p>Specifies the action to be taken for the unused tracks in this data set. This option is ignored if the data set is not sequential or partitioned.</p> <p><b>NO</b> — unused tracks will be kept.</p> <p><b>ALL</b> — for track-allocated data sets, all unused tracks are to be freed. For cylinder-allocated data sets, only the unused cylinders are freed.</p> <p><b>ROUND</b> — only unused extents are to be freed.</p> <p><b>TRK</b> — all of the unused tracks are to be freed even if the data set is cylinder-allocated.</p> <p>NOTE: If CPK, using the TRK option, releases a cylinder-allocated data set past its cylinder boundary, CPK will reset the indication in the DSCB that extent is cylinder-allocated. However, the secondary allocation type will remain the same as before the release. (The secondary allocation type is shown in the SPACE ALLOC field in the CPK map.)</p> <p>Default is the value of the PSRLSE= operand (if DSORG=PS) or PORLSE= operand (if DSORG=PO) of the SIMULATE or COMPAKT command. If PSRLSE= and PORLSE= were omitted, then only datasets covered by a SELECT command with the RLSE= operand will have free space released. If PSRLSE=/PORLSE= were specified, then SELECT commands with RLSE= can be used to override them for selected datasets.</p>
<b>SCRATCH=</b> <b>SCR</b>	<p><b>YES</b> — the data set is not to be restored when COMPAKting or simulating. During a real COMPAKTion the DSCBs for the dataset will be deleted from the VTOC;</p> <p>however, the dataset will NOT be uncataloged. When specified, POS=, RLSE=, VSRLSE= and %FREE= cannot also be specified.</p> <p><b>NO</b> — the data set will not be scratched.</p> <p>SCRATCH=YES must NOT be specified when:</p> <ol style="list-style-type: none"> <li>1) the SELECT command is part of a sequenced set</li> <li>2) The dataset specified is an ICF VSAM component</li> <li>3) The disk volume is SMS-managed</li> <li>4) CPK scratching has been disabled in the FDR/ABR option table (See Section 91 or 92).</li> <li>5) TYPE=RLSE or TYPE=FASTCPK was specified</li> </ol> <p>Default is NO.</p>
<b>VSRLSE=</b>	<p>Specifies the action to be taken for the unused tracks in any ICF VSAM components selected by this SELECT. It is ignored if the data set is not ICF VSAM.</p> <p><b>NO</b> — unused tracks will be kept.</p> <p><b>ALL</b> — components of ICF VSAM datasets will be released to the CA (control area) boundary closest to the HI-USED-RBA; additional CAs may be retained as free space for expansion if %FREE= or %VSFREE= is specified. Space will not be released from the VVDS or multi-volume components, but it will be released from ICF catalogs if DSN= specifies the fully-qualified catalog component name and OVERRIDE=YES was also specified.</p> <p>The default is NO unless VSRLSE=ALL was specified on the major command (except for ICF catalog components, which will be released ONLY if VSRLSE=ALL is specified on the SELECT).</p>
<b>%FREE=</b>	<p>Specifies that CPK is to leave this percentage of the data set free after COMPAKTion. RLSE= and/or VSRLSE= must also be specified or else %FREE= will be ignored. CPK will only release space on PS, PO and ICF VSAM data sets and will never increase these data sets in size. For example, if a data set occupies 100 tracks of which 20 tracks are used, %FREE=50 will leave the data set with 40 tracks. Values may be from zero (0) specifying that all of the unused space is to be freed, to 99 which says that 99% of the data set is to be left free.</p> <p>Default is 0 unless %FREE= was coded on the CPK statement, or the %PSFREE=, %POFREE= and/or %VSFREE= operands were coded on the CPK statement, depending on the type of dataset selected.</p>

## 40.10 SEQUENCE COMMAND

```

SEQUENCE  POS=VTOC /
SEQ        LVTOC /
           RVTOC /
           BEGIN /
           END /
           [c]ccccchhhh

```

**SEQUENCE COMMAND** This command is used when you wish to position a number of data sets, yet want to establish a positional relationship among the data sets. In essence, the SEQUENCE command allows you to treat its member data sets as a single sequenced group for purposes of positioning. The SEQUENCE command must be followed by one or more SELECT DSN= commands, specifying fully-qualified data set names (no filters) to define the members of the set, and an ENDSEQ command, delimiting the end of the set. The positioning sequence for members of a set is implicit in the sequence of the SELECT commands; i.e. the first named data set is positioned first, followed by the second named data set, and so on. [See Section 40.16](#) for more details.

**OPERANDS POS=**

- VTOC** — the set is to be placed as near the VTOC as possible, on either side of it.
- LVTOC** — specifies that the set is to be placed as close to the VTOC as possible, on the left side (lower numbered tracks) of it.
- RVTOC** — specifies that the set is to be placed as close to the VTOC as possible, on the right side (higher numbered tracks) of it.
- BEGIN** — the set is to be placed as near the beginning of the disk pack as possible.
- END** — the set is to be placed as near the end of the disk pack as possible.
- [c]ccccchhhh** — Code an 8 or 9-digit decimal cylinder/track address. The last 4 digits, the track address, must be zeroes. The cylinder address must be relative to zero. An address of all zeroes is invalid. CPK will fail if this address causes the set to overlap with an unmovable dataset or another absolute positioned dataset.

The default is POS=VTOC.

NOTE: If the VTOC is itself part of the set POS=VTOC implies POS=MIDDLE: i.e. the set is placed as near the center of the disk pack as possible. Also if the VTOC is part of a sequence set it will move.

If the VTOC is not part of the set, then POS=VTOC will place the set either before or after the VTOC; the VTOC will not be embedded in the set.

**40.11 ENDSEQ COMMAND****ENDSEQ**

**ENDSEQ  
COMMAND** This command must be used to delimit a sequenced set. It must follow the last SELECT command naming a member of the sequenced set.

**OPERANDS** None.

## 40.12 VTOC SELECT COMMAND

**SELECT**  
**\*\*\*VTOC**

**,POS=***\$LBKEEP* / *MIDDLE* / *BEGIN/END* / *ccccchhh*  
**,SIZE=***nnnnn*

**VTOC**  
**COMMAND**

This command is similar in function and use to the SELECT command, but applies only to the VTOC. You may use it to change the size and/or position of the VTOC. It may also appear as part of a sequenced set, under a SEQUENCE command, in which case the POS= operand must be omitted; in this case the sequence set defines the datasets which will immediately precede and/or follow the VTOC. A SELECT \*\*\*VTOC cannot be specified with TYPE=RLSE or TYPE=FASTCPK.

**OPERANDS**

**\*\*\*VTOC**

This is a required operand and identifies this SELECT command as applying to the VTOC.

**POS=**

Specifies the new position of the VTOC.

**KEEP** — the VTOC is to retain its position.

**MIDDLE** — you wish COMPAKTOR to position the VTOC as near the center of the disk pack as possible.

**BEGIN** — you desire the VTOC to be as near to the beginning of the disk pack as possible.

**END** — you desire the VTOC to be as near to the end of the disk pack as possible.

**ccccchhh** — code an absolute cylinder/head address if you desire to position the VTOC at a specific location. Code an 8 decimal number, the first 4 digits being the cylinder address, the last 4, the track address. Both addresses must be relative to zero. A specification of cylinder 0, track 0 is invalid. CPK will fail if the VTOC's new position overlaps an unmovable dataset or another absolute positioned dataset.

On a volume with over 65,535 tracks (such as the 3390-9) the end of the VTOC must be no higher than relative track 65,535 (cylinder 4368, track 14 on a 3390-9). If omitted, the default action is to retain the VTOC's position, unless this command appears under a SEQUENCE command. In that case, VTOC positioning is dependent on the position of the sequenced set and of the VTOC within the set.

**SIZE=**

If coded, supply 1 to 5 decimal digits giving the VTOC size in tracks. A value of 0 is invalid, as is a value in excess of the device capacity. CPK will fail if the expanded VTOC overlaps an unmovable dataset or an absolute positioned dataset.

If omitted, the VTOC retains its original size.

**NOTES ON**  
**VTOC**  
**POSITIONING**

When changing the location of the VTOC, the user should consider the following:

Placing the VTOC close to the physical center of the device (or alternately, about 1/3 of the way from the beginning) may improve performance, but it does divide the free space on the volume into two areas. On modern disks, with their fast access, you may wish to place the VTOC at the beginning of the volume.

Place the VTOC in such a manner that its last track is also the last track of a cylinder, i.e. the VTOC ends on a cylinder boundary. This also improves performance.

When a VTOC is relatively positioned, as with POS=MIDDLE, POS=BEGIN, or POS=END, COMPAKTOR always places the VTOC to end on a cylinder boundary. This is also true when the VTOC command is part of a sequenced set.

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**40.12 CONTINUED . . .**

- NOTES ON VTOC SIZING** When you change the size of the VTOC, make sure that the size is large enough to hold all current active DSCBs. If not, COMPAKTOR terminates execution with a control statement error.
- DEFAULT VTOC ACTION** If no VTOC command is present, COMPAKTOR always retains the original position and size of the VTOC.
- RESTRICTIONS** You can only change the VTOC size and position when specifying VTOC=COMPAKT on the CPK command. Otherwise, SELECT \*\*\*VTOC commands must not be present in the control statement input stream.
- If non-ICF VSAM data spaces which have non-zero secondary allocation specified exist on this volume, you cannot change the VTOC position or size or specify VTOC=COMPAKT.**

**40.13 EXAMPLES OF COMPAKTOR COMMANDS USAGE**

These examples are designed to illustrate the power and flexibility you have in structuring a disk pack, via the COMPAKTOR command language facility.

When structuring a disk pack, we suggest you run various simulations to test the effect of your structuring commands. COMPAKTOR simulation runs are fast and inexpensive and doing them will familiarize you with the use of the command language.

The [Section 40.16](#) of this guide should be read to more fully understand certain COMPAKTOR actions when positioning data sets.

**EXAMPLE 1** Position the VTOC in the middle of the volume and all data sets whose names begin with SYS1.V are placed as near the VTOC as possible. Temporary data sets are retained. OVERRIDE=YES is specified so that the Indexed VTOC ("SYS1.VTOCIX.volser") and the VVDS ("SYS1.VVDS.volser"), if present, will also be moved next to the VTOC, even though they are in the COMPAKTOR unmovable table.

```
CPK          TEMPS=KEEP, VTOC=COMPAKT, OVERRI DE=YES
SELECT      ***VTOC, POS=MIDDL E
SELECT      DSN=SYS1. VTOCIX. *, POS=VTOC
SELECT      DSN=SYS1. VVDS. *, POS=VTOC
```

**EXAMPLE 2** Simulate positioning certain data sets and prevent extent merging for all data sets whose names begin with IDP or FATS. Scratch some data sets.

```
SI M
SELECT      DSN=SYS1. COMPAKT, POS=00580003
SELECT      DSN=FATS. FATAR, POS=END
SELECT      DSN=I AM. FAST, POS=BEGI N
SELECT      DSN=I DP. **, POS=END, EXTENTS=KEEP
SELECT      DSN=FATS. **, POS=VTOC, EXTENTS=KEEP
SELECT      DSN=XYZ. *. CNTL, SCRATCH=YES
SELECT      DSN=Z**, SCR=YES
```

**EXAMPLE 3** Simulate a Fast COMPAKTion-in-place eliminating unused tracks or cylinders for sequential data sets, unused extents for partitioned data sets and unused control areas for ICF VSAM clusters. Keep all unused tracks for every data set whose name begins with IDP and keep the original position of every data set whose name begins with FDRDSF.

```
SI M          TYPE=FASTCPK, PSR=ALL, POR=ROUND, VSR=ALL
SELECT      DSN=I DP. **, RLSE=NO
SELECT      DSN=FDRDSF**, POS=KEEP
```

**EXAMPLE 4** Simulate restructuring a volume by positioning some data sets around the VTOC, which is moved to the middle of the volume, via the SEQUENCE command. Position other data sets at both the beginning and end of the volume and free all unused tracks from PS, PO and ICF VSAM data sets.

```
SI M          PSR=ALL, POR=ALL, VSR=ALL, VTOC=COMPAKT, HI =NO
SELECT      DSN=I DP. I AM, POS=BEGI N
SEQUENCE    POS=VTOC
  SELECT    DSN=SYS1. PARMLI B
  SELECT    DSN=SYS1. SVCLI B
  SELECT    ***VTOC
  SELECT    DSN=SYS1. LI NKLI B
  SELECT    DSN=SYS1. PROCLI B
ENDSEQ
SELECT      DSN=FDR. **, POS=END
SELECT      DSN=I AM. I AMDS**, POS=BEGI N
```

**NOTE:** See [Section 40.24](#) for warning on moving the VVDS and ICF CATALOGs.

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**40.13 CONTINUED . . .**

**EXAMPLE 5** Position the VTOC and change its size; place all data sets whose names begin with the letter A or B at the beginning of the volume, and those whose names begin with any letter from N to P at the end of the volume. Prevent multi-extent data sets from being merged into a single extent. The Indexed VTOC will be placed to the left (lower side) of the VTOC, and the VVDS will be placed on the right of the VTOC.

```
CPK          EXTENTS=KEEP, VTOC=COMPAKT, OVERRI DE=YES
SELECT      ***VTOC, POS=08850006, SI ZE=9
SELECT      DSN=SYS1. VTOCI X. *, POS=LVTOC
SELECT      DSN=SYS1. VVDS. *, POS=RVTOC
SELECT      DSN=A** , POS=BEGI N
SELECT      DSN=B** , POS=BEGI N
SELECT      DSN=N** , POS=END
SELECT      DSN=O** , POS=END
SELECT      DSN=P** , POS=END
```

**EXAMPLE 6** Fast COMPAKT a volume releasing all the unused space within sequential data sets. For all partitioned or sequential data sets whose names contain an index level of 'MASTER' release all of the unused space. The option used, TRK, will release to the exact number of tracks used even if the data set was cylinder-allocated.

```
CPK          TYPE=FASTCPK, PSRLSE=TRK
S           DSN=** . MASTER. ** , RLSE=TRK
```

**EXAMPLE 7** COMPAKT the volume and release space within sequential data sets. The %FREE option is used to leave data sets with a group name of 'PROD' with 20% free space. All other data sets will be left with 10% free space.

```
CPK          PSRLSE=ALL, %FREE=10
SELECT      DSN=PROD** , RLSE=ALL, %FREE=20
```

**EXAMPLE 8** Release unused space within PS and PO data sets on all online volumes starting with "TSO". CPK will not COMPAKT the volumes, only release space. PS data sets with a group name of TEST will be completely freed. All other data sets will be left with 10% free space. This release will only be done on volumes where the total space to be released is at least 300 tracks.

```
CPK          TYPE=RLSE, PSRLSE=ALL, PORLSE=ALL, %FREE=10, VOL=TSO* , MI NRLSE=300
SELECT      DSN=TEST** , DSORG=PS, RLSE=TRK
```

**EXAMPLE 9** Release all free cylinders in data set "A.B.C", and reduce all data sets (including ICF VSAM clusters) beginning with "C.D" to contain 20% free tracks, on all online volumes. Note that the RLSE= and VSRLSE= operands appear only on the SELECT commands, and not on the CPK statement; this is the proper way to release space ONLY on selected datasets.

```
CPK          TYPE=RLSE, VOL=*
SELECT      DSN=A. B. C, RLSE=ALL
SELECT      DSN=C. D. ** , %FREE=20, RLSE=TRK, VSRLSE=ALL
```

**EXAMPLE 10** Simulate conversion of any density 3380 to any other density when the target density 3380 is not actually installed on your system, by using the parameter DEVCYL=. This example shows simulating conversion to a 3380-K, which has 2655 cylinders. The VTOC is moved and expanded, and the VTOCIX and VVDS are positioned next to it.

```
SI M          DEVCYL=2655, VTOC=COMPAKT, OVERRI DE=YES, SELTERR=NO
SELECT      ***VTOC, POS=08850000, SI ZE=45
SELECT      DSN=SYS1. VTOCI X. *, POS=VTOC
SELECT      DSN=SYS1. VVDS. *, POS=VTOC
```

**40.14 COMPAKTOR JCL EXAMPLES**

The following examples illustrate the most common ways of executing COMPAKTOR. Note that for convenience, all STEPLIB/JOBLIB DD statements have been omitted in the examples; they may be required, depending on your installation's placement of COMPAKTOR.

**EXAMPLE 1** MAP a direct access volume.

```
//MAP          EXEC   PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=A
//SYSMAP       DD     SYSOUT=A
//SYSUDUMP     DD     SYSOUT=A
//DI SK1       DD     UNI T=3380, VOL=SER=MYDI SK, DI SP=OLD
//SYSI N       DD     *
MAP
```

**EXAMPLE 2** MAP all online disk volumes.

```
//MAP          EXEC   PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=*
//SYSMAP       DD     SYSOUT=*
//SYSSUMM      DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//SYSI N       DD     *
MAP           VOL=*
```

**EXAMPLE 3** MAP a disk pack dumped by FDR, from the backup tape.

```
//MAP          EXEC   PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=A
//SYSMAP       DD     SYSOUT=A
//SYSUDUMP     DD     SYSOUT=A
//TAPE1        DD     UNI T=TAPE, VOL=SER=FDRDMP, DI SP=OLD,
//              DSN=FDR. DUMP
//SYSI N       DD     *
MAP           FROMDD=TAPE1
```

**EXAMPLE 4** SIMULATE doing a COMPAKTion on selected online disk volumes. All online volumes whose serial begins with TSO or PROD will be simulated, using all COMPAKTOR defaults.

```
//SI M         EXEC   PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=*
//SYSMAP       DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//SYSI N       DD     *
SIMULATE VOL=(TSO*, PROD*)
```

**EXAMPLE 5** SIMULATE volume COMPAKTion of a disk pack dumped to tape by FDR.

```
//SI M         EXEC   PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=A
//SYSMAP       DD     SYSOUT=A
//SYSUDUMP     DD     SYSOUT=A
//TAPE1        DD     UNI T=TAPE, VOL=SER=FDRDMP, DI SP=OLD,
//              DSN=FDR. DUMP
//SYSI N       DD     *
SI M           FROMDD=TAPE1
```

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## 40.14 CONTINUED . . .

**EXAMPLE 6** SIMULATE doing a FAST COMPAKTion on selected online disk volumes. All online volumes whose serial begins with TSO or PROD will be simulated, using all COMPAKTOR defaults.

```
//SI M          EXECPGM=FDRCPK, REGI ON=4M
//SYSPRI NT     DD    SYSOUT=*
//SYSMAP        DD    SYSOUT=*
//SYSSUMM       DD    SYSOUT=*
//SYSUDUMP      DD    SYSOUT=*
//SYSI N        DD    *
                SI MULATE  TYPE=FASTCPK, VOL=(TSO*, PROD*)
```

**EXAMPLE 7** FAST COMPAKTion on an active volume to a maximum level of COMPAKTion. All active data sets will be made unmovable (DSNENQ=USE, ACTMESS=NO and CONFMESS=NO are the defaults). Only the used tracks of PS, PO and VSAM data sets will be relocated (DATA=USED is the default). CPKWORK is not required for FAST COMPAKTion.

```
//FASTCPK       EXECPGM=FDRCPK, REGI ON=4M
//SYSPRI NT     DD    SYSOUT=*
//SYSMAP        DD    SYSOUT=*
//SYSUDUMP      DD    SYSOUT=*
//SYSI N        DD    *
                COMPAKT   TYPE=FASTCPK, VOL=TS0001, HI =NO, SI ZEKEEP=0
```

**EXAMPLE 8** FAST COMPAKTion on multiple volumes. Free space will be released from all PS, PO and VSAM data sets. Only SUMMARY maps are printed. Active data sets will not be moved. Volumes will not be COMPAKTed unless the IBM fragmentation index for the volume exceeds 0.200 or there are more than 10 free space areas.

```
//FASTCPK       EXEC   PGM=FDRCPK, REGI ON=4M
//SYSPRI NT     DD    SYSOUT=*
//SYSMAP        DD    SYSOUT=*
//SYSSUMM       DD    SYSOUT=*
//SYSUDUMP      DD    SYSOUT=*
//SYSI N        DD    *
                COMPAKT   TYPE=FASTCPK, VOL=(TSO*, TEST*), MAPS=SUMMARY, HI LI GHT=NO,
                PSRLSE=ALL, PORLSE=ALL, VSRLSE=ALL, CPKFRAGI =2, CPKFREEEX=10
```

**EXAMPLE 9** FAST COMPAKTion with positioning. All PO data sets are to be positioned at the beginning of the volume. Other data sets will be positioned by normal COMPAKTOR rules (usually around the VTOC). All PO and ICF VSAM data sets will have space released (leaving 20% free space) if they have secondary allocation specified. Active data sets will not be moved.

Positioning may increase FAST COMPAKTion execution time since many tracks must be moved.

```
//FASTCPK       EXEC   PGM=FDRCPK, REGI ON=4M
//SYSPRI NT     DD    SYSOUT=*
//SYSMAP        DD    SYSOUT=*
//SYSUDUMP      DD    SYSOUT=*
//SYSI N        DD    *
                COMPAKT   TYPE=FASTCPK, VOL=LI B123, NOSECOND=NORLSE
                SELECT    ALLDSN, DSORG=PO, RLSE=ALL, %FREE=20, POS=BEGI N
                SELECT    ALLDSN, DSORG=EF, VSRLSE=ALL, %FREE=20
```

NOTE: If a CPK job is cancelled, COMPAKTOR V5.2 Level 30 and higher will issue an FDRW99 Message to the operator indicating that a CANCEL WILL RESULT IN POSSIBLE VOLUME CORRUPTION. See [Section 40.23](#) for more details.

CONTINUED . . .

## 40.14 CONTINUED . . .

**EXAMPLE 10** COMPAKT a SMS-managed disk volume from a FDR dump tape. The dump was performed at an earlier time. Since the disk dumped to the backup tape was SMS-managed, COMPAKTOR forces CPYVOLID=YES. The output volume specified by the VOL= parameter must be SMS-managed. This example will also work if both the backup and the target disk are NOT SMS-managed.

```
//COMPAKT      EXEC    PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD      SYSOUT=*
//SYSMAP       DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//CPKWORK      DD      UNI T=SYSDA, SPACE=(CYL, (1, 1))
//TAPE1        DD      DSN=FDR. BACKUP. VSMS001, DI SP=OLD
//SYSI N       DD      *
                COMPAKT  VOL=SMS001
```

**EXAMPLE 11** COMPAKT an active SMS-managed disk volume using dynamic allocation of the disk. First the disk is dumped and then restored in COMPAKTed form. The data sets will be enqueued for the duration of the DUMP and COMPAKTion. Two tape drives are used to minimize tape mount and rewind delays. Console message FDRW82 will be issued at the beginning and end of the COMPAKTOR restore.

This example will also work if disk is NOT SMS-managed.

```
//COMPAKT      EXEC    PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD      SYSOUT=*
//SYSMAP       DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//CPKWORK      DD      UNI T=SYSDA, SPACE=(CYL, (1, 1))
//TAPE1        DD      DSN=FDR. DUMP. VSMS123, DI SP=(, KEEP),
//              UNI T=(3480, 2), VOL=(, , 99)
//SYSI N       DD      *
                DUMP     TYPE=FDR, DSNENQ=USE, COMPRESS=ALL
                CPK       VOL=SMS123, DUMP=YES, ACTMESS=NO, LOG=YES
```

INNOVATION strongly recommends using DSNENQ=USE to prevent COMPAKTOR from moving active data sets, including ICF VSAM catalogs and page and swap spaces ([See Section 40.24 for more information](#)).

**EXAMPLE 12** COMPAKT a disk pack onto another disk pack. First the disk volume is dumped, and then restored onto the target volume. The volume serial of the target volume will be changed to OLDDISK on completion of the COMPAKTion. At that time, the original volume should be VARYed offline, and the new volume should be MOUNTed. If the original volume had an indexed VTOC, it must be rebuilt on the new volume with ICKDSF.

```
//COMPAKT      EXEC    PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD      SYSOUT=A
//SYSMAP       DD      SYSOUT=A
//SYSUDUMP     DD      SYSOUT=A
//CPKWORK      DD      UNI T=SYSDA, SPACE=(CYL, (1, 1))
//TAPE1        DD      DSN=FDR. DUMP. VOLDDISK, DI SP=(, KEEP),
//              UNI T=3480, VOL=(, , 99)
//DI SK1       DD      UNI T=3380, VOL=SER=OLDDISK, DI SP=OLD
//NEWDI SK1    DD      UNI T=3380, VOL=SER=NEWDSK, DI SP=OLD
//SYSI N       DD      *
                DUMP     TYPE=FDR, COMPRESS=ALL
                CPK       DUMP=YES, TODD=NEWDI SK1
```

**NOTE:** If a CPK job is cancelled, COMPAKTOR V5.2 Level 30 and higher will issue an FDRW99 Message to the operator indicating that a CANCEL WILL RESULT IN POSSIBLE VOLUME CORRUPTION. [See Section 40.23](#) for more details.

CONTINUED . . .

## 40.14 CONTINUED . . .

**EXAMPLE 13** RELEASE space from selected online disk volumes. All online volumes whose serial begins with TSO will be released. COMPAKTOR will attempt to release all excess tracks or cylinders from all PS, PO and ICF VSAM datasets, leaving 10% of the allocated space as free space. However, space will not be released from datasets which do not have a secondary allocation quantity, and any volume where the total tracks to be released is not 150 or more will be bypassed. ICF VSAM clusters with IPCS in their name will not have space released. Active data sets will not be released.

```
//RELEASE      EXEC    PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD      SYSOUT=*
//SYSMAP       DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//SYSI N       DD      *
               COMPACT TYPE=RLSE, PSRLSE=ALL, PORLSE=ALL, VSRLSE=ALL,
                   %FREE=10, NOSECOND=NORLSE, MI NRLSE=150, VOL=TSO*
               SELECT  DSN=**I PCS**, VSRLSE=NO
```

**EXAMPLE 14** Convert a 3380 single density or a 3380-E (double density) to a 3380-K (triple density) volume with COMPAKTOR, moving the VTOC to the first third of the volume. The VTOC index and the VVDS (if they exist) will be placed adjacent to the VTOC (if they do not exist, it will not be considered an error). The volume serial of the 3380-K (D3380A) will be changed to that of the original volume (D3380B), and the new volume will automatically be placed offline at the end of the COMPAKTion. At that time, the original volume should be VARYed offline, and the new volume should be MOUNTed. If the original volume had an indexed VTOC, it must be rebuilt on the new volume with ICKDSF.

```
//COMPAKT      EXECPGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD      SYSOUT=*
//SYSMAP       DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//CPKWORK      DD      UNI T=SYSDA, SPACE=(CYL, (1, 1))
//DI SK1       DD      UNI T=3380, DI SP=OLD,
//              VOL=SER=D3380B<- - - 3380- E
//NEWDI SK1    DD      UNI T=3380, DI SP=OLD,
//              VOL=SER=D3380A<- - - 3380- K
//TAPE1        DD      UNI T=3480, DI SP=(, CATLG) ,
//              DSN=BACKUP. D3380A, VOL=(, , , 20)
//SYSI N       DD      *
               DUMP    TYPE=FDR, COMPRESS=ALL
               CPK      DUMP=YES, TODD=NEWDI SK1, VTOC=COMPAKT,
               OVERRI DE=YES, SELTERR=NO
               SELECT   ***VTOC, POS=08850000, SI ZE=45
               SELECT   DSN=SYS1. VTOCI X. **, POS=VTOC
               SELECT   DSN=SYS1. VVDS. **, POS=VTOC
```

CONTINUED . . .

## 40.14 CONTINUED . . .

**EXAMPLE 15** Convert a 3390-3 (triple density) to a 3390-2 (double density) volume with COMPAKTOR, moving the VTOC to the middle of the volume. The VTOC index and the VVDS (if they exist) will be placed adjacent to the VTOC. The volume serial of the output disk will be changed to that of the original volume, and the new volume will automatically be placed offline at the end of the COMPAKTion. At that time, the original volume should be VARYed offline, and the new volume should be MOUNTed. If the original volume had an indexed VTOC, it must be rebuilt on the new volume with ICKDSF. This procedure will work only if there are no unmovable datasets in the upper third of the 3390-3 and if the total allocated tracks do not exceed the capacity of the output 3390 (if the input volume is not SMS-managed, then SELECT statements with the SCRATCH=YES operand may be used to exclude datasets to reduce the number of tracks to match the device capacity).

```
//COMPAKT      EXEC    PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD      SYSOUT=*
//SYSMAP       DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//CPKWORK      DD      UNI T=SYSDA, SPACE=(CYL, (1, 1))
//NEWDI SK1    DD      UNI T=3390, DI SP=OLD,
//              VOL=SER=D33902  <--- 3390-2 doubl e densi ty
//TAPE1        DD      UNI T=(3480, 2), DI SP=(, CATLG),
//              DSN=BACKUP. D33903, VOL=(, , 99)
//SYSI N       DD      *
              DUMP     TYPE=FDR, DATA=USED
              CPK      DUMP=YES, TODD=NEWDI SK1, VTOC=COMPAKT,
                      OVERRI DE=YES, SELTERR=NO,
                      VOL=D33903 <--- 3390-3 tri pl e densi ty
              SELECT   ***VTOC, POS=MI DDLE
              SELECT   DSN=SYS1. VTOCI X. **, POS=VTOC
              SELECT   DSN=SYS1. VVDS. **, POS=VTOC
```

**EXAMPLE 16** COMPAKT a disk in place (DUMP=YES). In order to reduce restore time, SIZEKEEP=(50,60) specifies that groups of 50 tracks or more will not be moved as long as COMPAKTOR is able to reduce the number of free space areas on the volume by at least 60%; data sets which are not moved will not have their tracks rewritten which improves COMPAKTOR elapsed time. Also, COMPAKTOR only sets the update flag on data sets which it moved, so SIZEKEEP will reduce the impact of COMPAKTion on a later ABR incremental backup. The default is SIZEKEEP=(100,90) which may affect COMPAKTOR results compared to earlier versions.

Also, all DB2 clusters are to be moved next to the VTOC (note that the second level of DSNDBD designates the data component name for DB2) and all other VSAM will have enough unused CAs released so that 25% of the remaining CAs are free for expansion.

```
//COMPAKT      EXEC    PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD      SYSOUT=*
//SYSMAP       DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//CPKWORK      DD      UNI T=SYSDA, SPACE=(CYL, (1, 1))
//TAPE1        DD      UNI T=(3490, 2), DI SP=(, CATLG),
//              DSN=BACKUP. D33901, VOL=(, , 99)
//SYSI N       DD      *
              DUMP     TYPE=FDR, DATA=USED
              CPK      DUMP=YES, VOL=D33901, SI ZEKEEP=(50, 60)
              SELECT   DSN=*. DSNDBD. *. *. I 0001. A+++, POS=VTOC
              SELECT   ALLDSN, DSORG=EF, VSRLSE=ALL, %FREE=25
```

CONTINUED . . .



## 40.14 CONTINUED . . .

**EXAMPLE 17** COMPAKT a disk in place (DUMP=YES), but make all possible datasets movable by specifying SIZEKEEP=0, overriding the default of SIZEKEEP=(100,90). This will result in the minimum number of free space areas after COMPAKTion (usually 1 or 2 if there are no unmovable datasets).

```
//COMPAKT      EXEC    PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD      SYSOUT=*
//SYSMAP       DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//CPKWORK      DD      UNI T=SYSDA, SPACE=(CYL, (1, 1))
//TAPE1        DD      UNI T=(3490, 2), DI SP=(, CATLG),
//              DSN=BACKUP. D33901, VOL=(, , 99)
//SYSI N       DD      ***
                DUMP    TYPE=FDR, DATA=USED
                CPK      DUMP=YES, VOL=D33901, SI ZEKEEP=0
```

**EXAMPLE 18** COMPAKT a disk in place (DUMP=YES). In order to reduce restore time, %FOLD=50 specifies that only data sets in the lower 50% of the allocated tracks on the volume will be movable. Since data sets which are not moved will not have their tracks rewritten, and COMPAKTOR stops reading the backup when all required tracks have been written, %FOLD=50 will require COMPAKTOR to read only the first half of the backup tape, reducing the elapsed time. Also, COMPAKTOR only sets the update flag on data sets which it moved, so %FOLD will reduce the impact of COMPAKTion on a later ABR incremental backup.

```
//COMPAKT      EXEC    PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD      SYSOUT=*
//SYSMAP       DD      SYSOUT=**
//SYSUDUMP     DD      SYSOUT=*
//CPKWORK      DD      UNI T=SYSDA, SPACE=(CYL, (1, 1))
//TAPE1        DD      UNI T=3490, DI SP=(, DELETE, CATLG),
//              DSN=BACKUP. D33902, VOL=(, , 99)
//SYSI N       DD      **
                DUMP    TYPE=FDR, COMPRESS=ALL
                CPK      DUMP=YES, VOL=D33902, %FOLD=50
```

**EXAMPLE 19** COMPAKT a disk in place (DUMP=YES). SORT=LREF,LRDAYS=25 is specified so that datasets which have been used in the last 25 days will be clustered around the VTOC, with the most recently referenced datasets closest to the VTOC, in order to reduce access time for the datasets most likely to be referenced again. Datasets referenced over 25 days ago will be clustered outside the other datasets, sorted by descending size.

```
//COMPAKT      EXEC    PGM=FDRCPK, REGI ON=2048K
//SYSPRI NT    DD      SYSOUT=*
//SYSMAP       DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=***
//CPKWORK      DD      UNI T=SYSDA, SPACE=(CYL, (1, 1))
//TAPE1        DD      UNI T=3490, DI SP=(, DELETE, CATLG),
//              DSN=BACKUP. D33903, VOL=(, , 99)
//SYSI N       DD      *
                DUMP    TYPE=FDR, DSNENQ=USE
                CPK      DUMP=YES, VOL=D33903, SORT=LREF, LRDAYS=25
```

**40.15 COMPAKTOR DATA SET TYPES**

COMPAKTOR recognizes the following data set types:

- TYPES** . . . Unmovable data sets.  
 . . . Unchangeable data sets.  
 . . . Standard-user-label data sets.  
 . . . Cylinder-boundary data sets.  
 . . . Track-boundary data sets.

**UNMOVABLE  
DATA SETS**

The following data sets are considered unmovable by COMPAKTOR:

- . . . Any ISAM data set.  
 . . . Non-ICF VSAM data sets.  
 . . . VSAM catalogs, page and swap data sets, and the VVDS if DUMP=YES and DSNENQ= are both specified, or if TYPE=FASTCPK is specified.  
 . . . On XA/ESA systems, all load libraries in the system linklist (LNKLSTxx).  
 . . . Any data set marked unmovable in the DSORG field (i.e., DSORG=PSU, POU, or DAU).  
 . . . Any BDAM data set whose Format 1 DSCB indicates that it is accessed via absolute addresses (OPTCD=A).  
 . . . Any data set named in a SELECT command also specifying POS=KEEP.  
 . . . Any data set specified in the COMPAKTOR Unmovable Table.  
 . . . When using the data set enqueue option (DSNENQ=), any data set found to be active.

A data set is active if it is currently allocated to another job in the system.

Data sets must be considered unmovable when they contain, within their data space, physical cylinder/track addresses. Moving these data sets would entail readjustment of these internal pointers, which COMPAKTOR is not designed to do. Note that a data set may also be unmovable if some other entity contains CCHH address pointers to locations within the data set. Unmovable datasets which are not inherently unmovable (such as ISAM) should be marked unmovable in the DSORG field (e.g., DSORG=PSU).

On COMPAKTion-in-place processing, COMPAKTOR will not restore the data of unmovable data sets. Otherwise, COMPAKTOR handles unmovable data sets by always restoring them to the same locations, on the target disk pack, as they occupied on the dumped pack. In this manner, all physical pointers within or to these data sets retain their validity.

The following restrictions apply to unmovable data sets:

- . . . You may not position unmovable data sets except those made unmovable by being in the unmovable table or by using the data set enqueue option. Data sets specified in the COMPAKTOR unmovable table or found active can be made movable using SELECT DSN= control statements if OVERRIDE=YES is specified on the CPK control statement or in the FDR/ABR option table ([See Section 91 or 92](#)).  
 . . . You may not scratch unmovable data sets.  
 . . . You may not free unused tracks in unmovable data sets.  
 . . . Unmovable data sets may not be members of a sequenced set.

CONTINUED . . .

**40.15 CONTINUED . . .****UNCHANGE-  
ABLE DATA  
SETS**

The following data sets are considered unchangeable by COMPAKTOR:

- . . . Any data set whose F1 DSCB indicates it contains track-overflow records.
- . . . Any data set originally allocated using the ALX subparameter of the SPACE= keyword of a DD statement.
- . . . Any data set named in a SELECT command also specifying EXTENTS=KEEP.
- . . . All ICF VSAM clusters if VSAMEXT=KEEP is specified on a SIMULATE or COMPAKT major command.
- . . . All non-VSAM data sets if EXTENTS=KEEP is specified on a SIMULATE or COMPAKT major command.

When COMPAKTOR recognizes a data set as being unchangeable, it never merges the data set's extents. However, it attempts to place all extents owned by the data set contiguous to one another.

**STANDARD  
USER LABEL  
DATA SETS**

These data sets were allocated with LABEL=SUL and are characterized by having a standard-user-label extent of 1 track and 1 to 15 data extents. COMPAKTOR will never merge the data extent(s) with the label extent.

The following restrictions apply to standard-user label data sets:

- . . . Positioning via absolute addresses is invalid.
- . . . They may not be members of a sequenced set.

**CYLINDER  
BOUNDARY  
DATA SETS**

These are data sets whose space was originally allocated so as to be on cylinder boundaries. The only restriction here is that these data sets must not be positioned on other than cylinder boundaries.

Although a data set was originally allocated on cylinder boundaries, it may later have been changed so that some of its extents are not on cylinder boundaries. When COMPAKTOR detects this, it treats such data sets as track boundary data sets, even though the DSCB specifies cylinder allocation.

**TRACK  
BOUNDARY  
DATA SETS**

These are data sets whose data space was originally allocated as either a number of tracks or a number of blocks. Absolute track allocated data sets are also considered track-boundary data sets. No restrictions apply to these data sets.

**40.16 COMPAKTOR DATA SET POSITIONING**

This section details some things to keep in mind when using the COMPAKTOR data set positioning facility. This facility allows you to position single data sets, groups of data sets and sequenced set(s).

**An excessive amount of positioning specifications may make it impossible for COMPAKTOR to position the remaining datasets on the volume, resulting in message CPK554E UNABLE TO COMPAKT or CPK556W UNABLE TO IMPROVE.**

**DATA SET GROUPS**

A data set group consists of one or more data sets whose names match a user-specified filter ([See Section 52.16 for details](#)) on a single SELECT statement. This group may be positioned relative to one of three locations on a disk pack-its beginning, its end, or its VTOC. COMPAKTOR then attempts to position each member of the group as near the requested location as possible. However, no attempt is made to maintain the relative positions of group members.

**SEQUENCED SETS**

A sequenced set consists of one or more data sets specified between SEQUENCE and ENDSEQ commands. The distinctive characteristic of a sequenced set is that the order of its members is maintained; i.e. the first member will always be placed in front of (relative to the beginning of a disk pack) the second member, which in turn will precede the third and so on.

COMPAKTOR treats a sequenced set as a single entity beginning on a cylinder boundary and occupying a data space as large as or larger than, the total data space required by its members. You should use sequenced sets when you wish to preserve the relative positions of certain data sets. This is particularly useful if you have already optimized data set placements on a volume so as to reduce arm movement.

Sequenced sets may be positioned either with relative or absolute addresses. Note that the VTOC may also be a member of a sequenced set.

You may sometimes find that data sets which are not members of any sequenced set have been placed between member data sets of a sequenced set. This is because a sequenced set can consist of cylinder and track boundary data sets. When a mixture of types exists, free space areas may be created within the sequenced set. These areas may then be used by COMPAKTOR for data set allocation.

**ABSOLUTE ADDRESS POSITIONING**

Absolute address positioning is selected by coding POS=cccchhhh on a SELECT or SEQ command. Single data sets, VTOCs and sequenced sets may be positioned this way; data set groups may not. Some things to consider:

- . . . Make sure any absolute position you specify does not create an overlap situation: where the data set or sequenced set runs into an area occupied by an unmovable data set, a VTOC, or a previous absolute address positioned entity.
- . . . Make sure the specified cylinder/track addresses are valid for the target disk pack. Also, remember that both cylinder and track addresses are relative to 0 and that an address of cylinder 0, track 0 is always invalid, since that location is used by the Operating System.
- . . . Make sure, when positioning cylinder-boundary data sets, that you specify a valid cylinder boundary as the absolute address. This is done by always coding the track addresses as zeroes. e.g.: POS=01900000.
- . . . Make sure that you position sequenced sets on a cylinder boundary. That is, their address must be specified as if the sequenced set were a single cylinder-boundary data set.
- . . . Note that careless use of the absolute address positioning feature may end up fragmenting a volume into more free space areas than existed before COMPAKTion. This can occur when you leave unused free areas between absolute address positioned data sets and COMPAKTOR is unable to fill these 'holes'.

CONTINUED . . .

## 40.16 CONTINUED . . .

**RELATIVE  
ADDRESS  
POSITIONING**

Relative address positioning is effected by the user coding POS=VTOC, POS=LVTOC, POS=RVTOC, POS=BEGIN or POS=END on a SELECT or SEQ command. Consider the following when you use relative address positioning:

- . . . The order of appearance, in the COMPAKTOR control statements input stream, of SELECT commands is immaterial for purposes of relative address positioning. That is, when two or more data sets are to be placed as near the VTOC as possible, for example, it is not possible to predict which one will end up immediately adjacent to the VTOC.
- . . . Sequenced sets, however, are always positioned according to their appearance in the control statement input stream. Thus, if two sequenced sets are to be placed at the beginning of the volume, the first one in the input stream will be the one closest to the volume's first track.

**RELATIVE VS.  
ABSOLUTE**

When large numbers of data sets are to be positioned, we recommend that you use relative address positioning, as COMPAKTOR will then usually do a better job of reorganizing the volume. As previously noted, absolute address positioning can sometimes lead to poorly organized volumes. If used at all, it should be used carefully; you probably would first want to lay out the new volume organization on a piece of paper.

In any case, we strongly urge you to perform simulations when you position data sets. This is an inexpensive way of checking the new organization of a volume and does not alter the volume in any manner.

**VTOC  
POSITIONING**

COMPAKTOR allows you to position a VTOC at any valid location on a volume, and to increase or decrease its size.

VTOCs are often placed near the middle of volumes, or about 1/3 of the way into the volume, as this tends to reduce arm movement by placing the VTOC closer to datasets on the volume. However, on modern hi-speed disks this is less of a consideration and VTOCs are often placed at the beginning of the volume to maximize free space.

VTOCs should be placed so that they end on a cylinder boundary; i.e.: the last VTOC track should be the last track of a cylinder. This allows Operating Systems routines to search the VTOC in a more efficient manner. COMPAKTOR automatically does this when the VTOC is relative positioned or part of a relative positioned sequenced set. VTOCs may be positioned either separately or as part of a sequenced set. The sequenced set can be either absolute or relative positioned.

Remember that you can only position the VTOC by specifying VTOC=COMPAKT on the COMPAKT command. This still may not work, if any non-ICF VSAM data space has a non-zero secondary allocation quantity; in that case, COMPAKTOR will not honor VTOC changes in position or size.

**REORGANIZ-  
ING THE  
VTOC**

COMPAKTING the VTOC may cause temporary additional system overhead because it makes the DSCB TTRs incorrect in the catalog. For cataloged non-VSAM data sets, the Operating System records, in the catalog entry, the location of the DSCB. When the data set is OPENed, OPEN is able to go directly to the right place to read the DSCB. If the DSCB has been moved by COMPAKTOR, then OPEN's first attempt to read the DSCB fails, and OPEN has to search through the VTOC or VTOCIX to find the DSCB. This overhead is only incurred once per data set, because OPEN causes the catalog entry to be updated with the new DSCB location. This overhead is less if the volume has an indexed VTOC.

Another disadvantage of COMPAKTING the VTOC is that it puts all of the available (Format 0) DSCBs at the end of the VTOC. This causes the search for an available DSCB, when a new data set is allocated, to take longer than if the available DSCBs were distributed throughout the VTOC. This condition will be alleviated as old data sets are scratched and their DSCBs are freed. This is not a problem if the volume has an indexed VTOC.

For these reasons, we recommend that you not specify VTOC=COMPAKT unless you are changing the position or size of the VTOC. VTOC=COMPAKT is not valid for a FAST COMPAKTion (TYPE=FASTCPK).

**40.17 COMPAKTOR REORGANIZATION**

COMPAKTOR uses a number of algorithms in order to determine the optimal method of reorganizing a disk pack. The essential criteria for reorganization are:

- . . . Reorganized volume must have as few 'holes' as possible.
- . . . Reorganized volume must have as few split data sets as possible.

**HOLES** A 'hole' is an unused area of a volume. All COMPAKTOR algorithms attempt to minimize the number of holes in a reorganized volume.

**DATA SET SPLITTING** COMPAKTOR always attempts to reduce multi-extent data sets to a single extent (but see SIZEKEEP= in this Section). When this is not possible, it leaves data sets into 2 or more extents. However, no data set is ever split into more extents than it originally possessed; i.e.: no data set becomes 'worse' than before COMPAKTion. In extreme cases, CPK may change the size of the extents.

**COMMON TO ALL ALGORITHMS** Before any algorithm is used, COMPAKTOR does the following:

- . . . Allocation of unmovable data sets.
- . . . Allocation of VTOC, if unmovable or absolute positioned.
- . . . Allocation of absolute positioned data sets and sequenced sets.
- . . . Allocation of relative positioned VTOCs and sequenced sets.
- . . . Allocation of relative positioned data sets.

When all of the above steps have been performed, COMPAKTOR then begins to go through its various algorithms to determine the structure of the reorganized disk pack.

**ALGORITHM SELECTION** If any algorithm satisfies certain minimum reorganization objectives, COMPAKTOR selects that algorithm for COMPAKTing the volume. However, when no algorithm meets the criteria, an algorithm selection process takes place. The default process used by COMPAKTOR is:

- . . . The results of all algorithms are compared.
- . . . If one algorithm has COMPAKTed the volume into fewer holes than the others and fewer than originally existed, that algorithm is selected.
- . . . If two or more algorithms COMPAKTed to an equal number of holes, the one which split the fewest data sets is selected.
- . . . If two or more algorithms also compare equal on number of data set splits, the first one used is selected.
- . . . The case where no algorithm improves a volume is discussed in the following section of this chapter.

**USING THE OBJECT= KEYWORD** The user can vary the algorithm selection process by specifying his/her primary objective in reorganizing a volume: maximizing free space or minimizing data set extents.

Code OBJECT=MAXFREE or default it if maximizing free space is your objective. This leaves the algorithm selection process as described above.

Code OBJECT=MINEXTS if minimizing multi-extent data sets is your primary objective. However, if specified, it alters the algorithm selection process as follows:

- . . . The algorithm selected is the one which resulted in the fewest data set splits.
- . . . If two or more algorithms split the same number of data sets, the one which resulted in fewer holes is selected.
- . . . Multi-extent data sets are excluded from SIZEKEEP processing.

CONTINUED . . .

## 40.17 CONTINUED . . .

**EFFECT OF  
SIZEKEEP  
AND %FOLD  
OPTIONS**

The SIZEKEEP= and %FOLD= performance options may affect the results of the COMPAKTOR algorithms just described. The %FOLD= operand must be specified on the COMPAKT statement to have an effect, but the SIZEKEEP= operand has a default (specified in the FDR/ABR Global Options Table) which may affect results even if the operand is not present. [See Section 40.08](#) for the complete description of these operands.

The SIZEKEEP= operand has 3 suboperands, a size (in tracks), a percentage and an extent count, which default to 100 tracks, 90% and 5 extents (unless you have changed the defaults in the FDR/ABR Global Options Table). The purpose of SIZEKEEP is to improve the efficiency of COMPAKTOR by making some data unmovable, as long as a significant improvement can still be made in the fragmentation of the volume. The percentage is a minimum reduction in the number of free space areas on the volume which must be produced for SIZEKEEP to be honored; so by default, COMPAKTOR must be able to reduce the free area count by 90%.

The size suboperand of SIZEKEEP causes COMPAKTOR to look for contiguous groups of allocated tracks which are at least that large (by default, 100 tracks or larger). These groups may contain multiple data sets, but they are bounded by an existing free space area on either side. COMPAKTOR will mark these groups unmovable and then execute each placement algorithm to move other data sets and see if the required percentage reduction in free areas can be achieved. If so, an algorithm will be chosen. If not, then part of that list of unmovable groups is discarded (the smaller groups) and the algorithms are driven again. This repeats until the required percentage is achieved or until the list is empty.

The third operand, extent count, controls SIZEKEEP processing of multi-extent data sets. Data sets with more than the specified number of extents (default 5) will not be considered to be part of any SIZEKEEP track group.

If the unmovable groups chosen by SIZEKEEP contain one or more extents of a multi-extent data set, but not all of its extents, COMPAKTOR may move the other extents of the data set but will not combine them. In other words, the actions of SIZEKEEP may cause COMPAKTOR to leave some data sets in multiple extents where it would normally combine them.

You can specify SIZEKEEP=0 to nullify the operation of SIZEKEEP, but this may significantly increase the elapsed time of the COMPAKTion while providing very little additional benefit. For FAST COMPAKTion (TYPE=FASTCPK) SIZEKEEP=0 may still keep some groups over 100 tracks as long as the free space areas are reduced to 1 or 2.

%FOLD= also has a value which is a percentage. In this case, it is a percentage of the total allocated tracks on the volume. Only those data sets whose extents are toward the beginning of the volume, within that percentage of allocated tracks, will be moved; data sets in the remainder of the volume will be made unmovable. COMPAKTOR will attempt to move all of the movable data sets into free space areas between the unmovable data sets at the top of the volume, essentially "folding" the lower part of the volume onto the upper part. However, other COMPAKTOR positioning rules, as well as SIZEKEEP, will also apply.

%FOLD was designed only for a COMPAKT-in-place from an FDR backup tape (DUMP=YES) since COMPAKTOR can stop reading the backup as soon as all tracks being moved have been read from it. In other words, it only needs to read the first "%FOLD" of the backup tape.

**40.18 COMPAKTOR OUTPUT**

When a disk pack is COMPAKTeD, COMPAKTOR prints 'before' and 'after' maps of the disk pack. This is true whether you actually COMPAKTeD the volume or only simulated COMPAKTion. Along with these maps, a summary map of the volume is also printed.

**MEASURING  
THE IMPROVE-  
MENT**

To determine how much COMPAKTOR has improved a volume, you should examine the summary map and carefully compare the before/ after figures for the following fields:

- . . . NUMBER OF FREE SPACE AREAS. This is a measure of volume fragmentation and will almost invariably be smaller after COMPAKTion.
- . . . NUMBER OF FREE CYLINDERS. This too is a measure of volume fragmentation. Normally, this amount will be larger after COMPAKTion.
- . . . SIZE OF LARGEST FREE AREA, IN TRACKS. Again, a measure of volume fragmentation. Normally, you will find a larger contiguous free area after COMPAKTion.
- . . . NUMBER OF DATA SETS WITH 2 OR MORE EXTENTS. This figure tells you how many multi-extent data sets exist on the volume. Will almost invariably be less after COMPAKTion.
- . . . NUMBER OF EMPTY TRACKS IN PS/PO/VSAM DATA SETS. This figure is the total number of unused but allocated tracks on a volume; many of these tracks can be reclaimed by specifying PSRLSE=, PORLSE= and/or VSRLSE= on the SIM or CPK commands, or RLSE= and/or VSRLSE= on SELECT statements. If you do this, the after COMPAKTion figure will usually be smaller.
- . . . NUMBER OF TEMPORARY DATA SETS. For a COMPAKTion-from-backup, unless you requested that temporary data sets were to be retained, after COMPAKTion this figure will be zero; the tracks owned by temporary data sets are added to the total free tracks on the volume. Temporary data sets are not deleted by TYPE=FASTCPK.
- . . . NUMBER OF UNUSED VTOC TRACKS. This is a measure of VTOC fragmentation. This figure will often be larger after COMPAKTion, due to reduced fragmentation, if VTOC=COMPAKT was specified.
- . . . IBM FRAGMENTATION INDEX. This index attempts to show the level of fragmentation on a disk volume. It is calculated by an IBM-provided formula using the size of free space areas on the volume. A value of 0.000 is achievable only when there is only a single free area, and values close to 1.000 occur when there are many very small free areas (such as every other track). The formula is a non-linear function involving natural logarithms, and is not directly related to the number or size of the areas; it is biased toward most of the free space being collected into one large area. Innovation has reluctantly implemented this IBM index, since it is difficult to understand and does not always accurately reflect the effect of fragmentation on the ability to allocate data sets; generally, if there are 3 or fewer free areas the fragmentation index should be ignored. Since VTOCs are typically in the middle of a volume, 2 free space areas are common after COMPAKTion. Innovation believes that volumes with fragmentation indexes over 0.200 or over 10 free space areas should be COMPAKTeD, but you may need to run COMPAKTOR simulations on all your volumes to decide what threshold should be used by your installation.

**FAILURE TO  
IMPROVE**

There are two conditions under which COMPAKTOR may not improve a volume:

- . . . User-specified positioning forced COMPAKTOR to create a more fragmented volume.
- . . . The volume is already optimally organized. Perhaps you just COMPAKTeD it or perhaps there is only one data set on the volume.

In the first case, COMPAKTOR goes ahead with COMPAKTion, under the assumption that you know what you are doing. The second condition is more complicated. If any user-specified data set or VTOC positioning was performed or if any unused tracks were freed, COMPAKTOR will go ahead and COMPAKT the volume.

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**40.18 CONTINUED . . .**

**MESSAGE CPK556W** When unable to COMPAKT a volume, and if no user-specified data set positioning is present, COMPAKTOR issues message CPK556W UNABLE TO IMPROVE. This message means that the volume, as it currently exists, cannot be made better by COMPAKTOR. In this situation, COMPAKTOR will print the “before” map and summary. You can force COMPAKTOR to COMPAKT the volume by specifying any space release or positioning parameters.

**THE EFFECT OF UNMOVABLE DATA SETS** When a volume has no unmovable data sets and you do not specify absolute positioning for any data set, COMPAKTOR can always reorganize a volume to one or two free space areas (subject to the effect of SIZEKEEP= and %FOLD= as described in [Section 40.17](#)). The presence of unmovable and user-specified absolute positioned data sets has a detrimental effect on volume reorganization, since COMPAKTOR must attempt to reorganize around those data sets. If you determine that some volumes are not being optimally reorganized, it is probably due to these causes.

**40.19 COMPAKTOR TECHNICAL DESCRIPTION**

This chapter deals with a few items of a technical nature which should be considered when using COMPAKTOR.

**ACCESS TECHNIQUE** COMPAKTOR uses EXCP level code to access disk devices. All accesses are at the track level, i.e.: COMPAKTOR always reads or writes a track at a time. Hence, it is access-method independent. Individual data sets are not opened.

**VOLUME LABEL PROCESSING** As a default, COMPAKTion from a backup restores the volume serial number of the dumped volume. If either the VTOC location or the volume serial number is changed, COMPAKTOR automatically updates the UCB to reflect the changes. If another mounted volume has the same volume serial number COMPAKTOR will place this volume offline. In that case, you may want to vary the original volume offline and then mount the new volume in its place. Optionally, you may request that COMPAKTOR retain the volume serial number of the target volume; however, if the volume contains ICF VSAM clusters or is SMS-managed, this may make the volume unusable.

**VOLUME TYPES** COMPAKTOR only supports validly formatted OS direct-access volumes. DOS/VSE volumes with VTOCs starting at cylinder zero head zero and VM/CMS formatted disk packs are not supported. COMPAKTOR V5.2 and above automatically supports volumes with a non-standard size (a number of cylinders not matching the size of a standard IBM DISK) by honoring the number of cylinders shown in the VTOC of the output Disk. This supports OS formatted VM mini-disk and non-IBM disk subsystems with a non-standard DISK size.

**ALTERNATE TRACK PROCESSING** All assigned alternate tracks on the target volume are retained by COMPAKTOR. Defective primary tracks are thus always restored to their assigned alternates.

**DIAGNOSTICS** COMPAKTOR performs a unique VTOC validation function. All VTOC errors and/or inconsistencies detected cause appropriate diagnostic messages to be issued.

Upon termination of a COMPAKTOR job step, either a completion code of zero is provided or one of a number of user abends is issued. User abends are used rather than non-zero completion codes even when COMPAKTOR successfully completes; this is to ensure that attention is drawn to all diagnostic messages. Non-zero completion codes often tend to be overlooked.

User abend U0888 is used to indicate that COMPAKTOR encountered an unusual condition, but that it did not stop COMPAKTOR from completing the COMPAKTion. The abend is issued to call attention to the message documenting the error, since it may have affected the usability of the COMPAKted volume. However, the option CPKCC in the FDR/ABR option table may be changed to substitute a completion code for the U0888 abend ([See Sections 91 or 92](#)).

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## 40.19 CONTINUED . . .

**SECURITY** Before modifying a volume, COMPAKTOR checks to see if any other jobs in the system have OPEN datasets on the device to be restored by testing a OPEN count in the UCB of the disk device. If so, COMPAKTOR may issue a WTOR for console message FDRW81 and prevent modification until all other users of the device have closed their open data sets. However, the operator has the option to allow the COMPAKTion to proceed despite the active datasets. This is not desirable unless the rules for COMPAKTing an active volume have been followed ([See Section 40.24](#)). This WTOR can be suppressed by the option ACTMESS=NO on the COMPAKT command or in the FDR/ABR option table. FAST COMPAKTion (TYPE=FASTCPK) and space release (TYPE=RLSE) default to COMPAKTing active volumes and assumes ACTMESS=NO.

A WTOR for console message FDRW80 is normally issued to allow the system console operator to confirm a CPK restore operation; if the restore is undesirable, the operator may cancel it at this point. This WTOR may be suppressed by the option CONFMESS=NO on the COMPAKT command. FAST COMPAKTion and space release assume CONFMESS=NO.

COMPAKTOR, as a default, issues a reserve on the VTOC of the direct-access device, to prevent VTOC updates while it is running.

RACF volume protection (CLASS= 'DASDVOL') is supported by COMPAKTOR if the RACF or ALLCALL option is enabled in the FDR/ABR option table ([See Section 91.06](#)). Individual data sets are not checked.

COMPAKTOR supports the FDR OPEN EXIT ([See Section 91.06](#)). Control is passed to the user exit prior to the restore of the volume. The COMPAKTion or release can be terminated by this exit.

**SHARED DASD  
ENVIRON-  
MENT**

When COMPAKTing a disk pack in a shared DASD environment, you must be extremely careful. Unless you have a cross-system ENQ facility (GRS or a third-party equivalent), COMPAKTOR has no way to know what datasets are in use on another CPU or to prevent other CPUs from OPENing datasets in the middle of COMPAKTion. In this case, you may need to manually ensure that the volume is OFFLINE to the other systems in the shared DASD environment.

Note that the default of ENQ=RESERVE on the COMPAKT command does not fully protect you. Assume you have two CPUs, System A and System B, which share a number of DASD devices. Also, assume that a long-running job is executing in System B, accessing a data set residing on a volume mounted on one of the shared devices. If you now start a job in System A in order to COMPAKT the same volume and you specify ENQ=RESERVE, the following occurs:

- 1) COMPAKTOR grabs ownership of the device via the RESERVE macro, forcing the job in System B to wait until the device is again available.
- 2) The volume on the device is COMPAKTed, and the data set which was being accessed from System B is moved to a new disk location.
- 3) And now, after COMPAKTOR issues a DEQ macro to release the device, the job in System B, unaware that its data set has been moved, tries to access it at its old location. Results are unpredictable and certainly undesirable.

If you have a cross-system ENQ facility, and that facility is broadcasting SYSDSN ENQs to other CPUs, then you can use the DSNENQ= option (as described in [Section 40.24](#) for COMPAKTing active volumes) to identify the datasets in use on the other systems and make them unmovable. If that facility also broadcasts SYSVTOC ENQs, it may be possible to have that facility convert the hardware reserve done by CPK into a global ENQ instead, so that only the VTOC will be ENQed rather than the entire volume being RESERVED; however, the vendor documentation for your cross-system ENQ facility should be consulted before allowing SYSVTOC to be converted as there may be additional considerations.

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## 40.19 CONTINUED . . .

**UPDATE  
INDICATORS**

After a volume has been COMPAKTeD, the update indicator will be turned on in the Format 1 DSCB of every dataset that COMPAKTOR moved on the volume, as if those datasets had been opened for output.

This is done for compatibility with ABR incremental backup. Because of the “backward recovery” technique used by ABR full-volume recovery ([See Section 50](#)), a dataset must be backed up by ABR if its location changes, even if its contents have not changed. This means that the next ABR incremental backup (DUMP TYPE=ABR) done on a volume after a COMPAKTion will backup many of the datasets on the volume.

The SIZEKEEP= option of COMPAKTOR is designed to reduce the impact of this. SIZEKEEP ([See Section 40.08](#)) attempts to avoid moving the largest datasets on the volume as long as it can still achieve a significant reduction in the number of free-space areas on the volume by moving the smaller datasets. If it is successful, then only the smaller datasets will have their update flag set and the amount of data to be backed up by the ABR incremental will be significantly less. The default value of SIZEKEEP=(100,90,5) distributed with CPK allows CPK to leave groups of tracks whose size is 100 tracks or more in place as long as the number of free-space areas can be reduced by 90%.

NOTE: Custom Zap not to turn on the update bit is available for CPK customers who do not have ABR.

**40.20 COMPAKTOR VTOC ERRORS**

As previously noted, COMPAKTOR performs rather stringent error diagnostics on VTOCs. Problems that exist but are not diagnosed by any available software, are detected and reported by COMPAKTOR. Our experience to date indicates that these are the most common errors:

- INVALID F5 DSCBS** There generally are 2 types of F5 DSCB errors: either the free space described is not valid, or a free area described by a Format 5 DSCB is actually allocated to a current dataset. The first case leads to loss of free space, but is generally non-harmful; the second case, however, is extremely serious and can lead to loss of data if the space is assigned to a second dataset.
- NOTE: If an active indexed VTOC exists on a volume, then the Format 5 DSCBs are never valid, and CPK does not inspect them.
- OVERLAPPING EXTENTS** Overlapping extents occur when two or more F1 or F3 DSCBs define extents which contain the same tracks. This is an extremely serious condition and can lead to loss of data.
- INVALID EXTENT DESCRIPTORS** An extent descriptor in an F1 or F3 DSCB is invalid if its cylinder and track addresses are invalid for the device or the extent ending address is lower than the starting address. Such a dataset may be unusable.
- INVALID FLAGS IN EXTENT DESCRIPTORS** Each extent descriptor has a flag byte, describing the type of extent. A common error is that the flag byte defines the extent as being on a cylinder boundary when it is not. This error may or may not be serious, depending on data set organization and access techniques used.
- BROKEN F1-F2-F3 DSCBs** Format 2 DSCBs exist for ISAM datasets; Format 3 DSCBs exist for any type of dataset which has more than 3 extents. The Format 1 DSCB points to the Format 2 or Format 3 DSCBs if they exist (A Format 2 may point to a Format 3). COMPAKTOR detects any broken chains, as well as any unrelated F2/F3 DSCB; i.e.: when an F2/F3 DSCB is present but its F1 DSCB is missing. This condition is serious if a broken chain exists, but harmless if an unrelated DSCB exists. However, the error must be corrected for COMPAKTOR to run.
- By default, COMPAKTOR will produce message CPK516E and terminate with an error if a broken chain or unrelated DSCB is found, leaving it to you to correct the error before rerunning COMPAKTOR. However, if the option BADCHAIN=IGNORE is specified, COMPAKTOR will delete any unchained DSCBs. However, you must be sure that the only DSCBs identified in CPK516 messages are F3 DSCBs before using BADCHAIN=IGNORE.
- FORMAT 4 DSCB ERRORS** A warning message is issued if error flags are found set in the VTOC status byte field of a Format 4 DSCB. Also, if the F4 DSCB is not the first record in a VTOC, COMPAKTOR cannot process the volume; the volume violates IBM Operating Systems standards.

**40.21 COMPAKTOR ERROR RECOVERY**

COMPAKTOR has been designed to handle various error conditions by recovering from the errors. Recovery actions are as follows:

- VTOC ERRORS** COMPAKTOR recovers from certain VTOC error conditions, such as invalid F5 DSCBs and invalid flags in extent descriptors, automatically.
- I/O ERRORS** I/O errors while reading/writing a VTOC or the first few blocks of an FDR dump tape (the DSF blocks) cause immediate abnormal termination. This is because the involved volumes are essentially unusable.
- DISK I/O ERRORS** When operating system error recovery notifies COMPAKTOR of a permanent I/O error while writing a disk track during the restore, COMPAKTOR skips that track. Up to 20 tracks in error may be skipped (this value may be changed with the MAXERR= operand). At the end of the restore operation, COMPAKTOR prints a list of all non-restored, or skipped tracks; the datasets involved can be determined by comparing this list to the “before” map. It is then up to you to determine whether the restored volume is usable or not.
- TAPE I/O ERRORS** When COMPAKTOR is notified of a permanent I/O error while reading from the backup dataset by system error recovery, it skips the bad tape blocks and attempts to restore as much of the volume as possible. Each tape block may contain one or more original disk tracks. A list of non-restored tracks is printed after the end of the restore operation; the datasets involved can be determined by comparing this list to the “before” map. It is then up to you to determine whether the restored volume is usable or not. Up to 20 tape blocks may be skipped (may be increased by the MAXERR= operand).
- USABLE VOLUMES** When mapping or simulating, all volumes are always usable, since COMPAKTOR never alters them.
- When COMPAKTING, a volume is usable if:
- a) Message CPK321I was not issued prior to termination.
  - b) If message CPK322I was issued prior to termination. However, if termination was abnormal, the volume may or may not be usable.
- If LOG=YES was specified, CPK also issues message FDRW82 to the operator concurrent with the CPK321I and CPK322I messages, so that the operator knows when CPK has begun modifying the volume and when it is done.
- I/O ERROR DIAGNOSTICS** When a tape or disk I/O error is encountered, COMPAKTOR prints a MINI DUMP to aid you in identifying the track or block in error and the cause of the error.

**40.22 COMPAKTOR PROBLEM DETERMINATION**

Although COMPAKTOR has been engineered to have a high degree of reliability, sometimes errors can occur which necessitate problem determination and correction.

**VTOC ERRORS** When VTOC errors are diagnosed by COMPAKTOR, we suggest you do the following:

- . . . Determine the true error cause. COMPAKTOR will usually inform you of the address of the DSCB in error. You can then display the VTOC using either the IEHLIST utility (command LISTVTOC with the DUMP option), or FDRDSF with the PRINT TYPE=DSF,DSN=VTOC option (See Section 20).
- . . . If the error can be fixed by COMPAKTOR, we suggest you COMPAKT the volume.
- . . . If COMPAKTOR cannot correct the error, you must fix the invalid DSCB by using the SUPERZAP utility program as described in IBM SRL publications under the names IMASPZAP, HMASPZAP or AMASPZAP.
- . . . If you are uncertain of the nature of the error or if you just feel insecure, do not hesitate to contact INNOVATION DATA PROCESSING.

**I/O ERRORS** When I/O errors occur, we suggest you carefully examine all COMPAKTOR output and attempt to determine the cause of the error. Areas of importance are:

- . . . The IOB sense information.
- . . . The CSW in the IOB.
- . . . The last disk track accessed -- track in error.
- . . . The CCW being executed.

NOTE: Tape I/O errors can be avoided by certifying your tapes with FATS, a program product of INNOVATION DATA PROCESSING (This is a plug!). Also, if you desire to be very safe, we suggest you use the FDR duplicate tape option, by supplying a TAPE11 DD statement. This option creates duplicate files of the dumped disk volume.

**CONTACTING INNOVATION FOR ASSISTANCE** If you need to contact INNOVATION DATA PROCESSING for assistance, please have the following at hand:

- . . . A dump, if applicable.
- . . . An IEHLIST listing of the VTOC using the DUMP format.
- . . . COMPAKTOR run output.

Having these listings at hand when you contact us will greatly speed up problem resolution.

## 40.23 RECOVERING FROM COMPAKTOR ERRORS

**RESTARTING  
COMPAKT-  
FROM-BACKUP**

The following is a description of the condition of the disk volume if COMPAKTOR is unable to complete a DUMP=YES COMPAKTion due to system crash, operator cancel or any other abnormal termination. (A DUMP=NO COMPAKT-from-backup may simply be restarted).

First COMPAKTOR will dump the volume to the backup file using FDR. If a termination occurs during this phase, the volume has not been modified in any way. The COMPAKTion can be restarted. After a successful completion of the backup, COMPAKTOR will map the volume to document current data set placement (the "before" map). If a termination occurs during this map, the user can also restart the COMPAKTion since the volume has not been modified.

If COMPAKTOR determines that the volume can be improved by COMPAKTion, an operator message (FDRW80) is issued (unless the CONFMESS=NO option has been selected). If the operator responds YES to this message, COMPAKTOR will print CPK321I COMPAKTOR RESTORE STARTED. From this point until message CPK322I COMPAKTOR RESTORE ENDED is issued, the volume is being modified and any failure may leave the volume in a corrupted state. If LOG=YES was specified, the operator will be notified by an FDRW82 Message when the restore starts and ends.

First, COMPAKTOR resets all of the extent information in the VTOC to reflect the new locations of all of the data sets. In the Format 4 DSCB, the key field may be set to binary zero, the pointer to the highest address of the FORMAT 1 DSCB (high water mark) may be set to the second DSCB in the VTOC, and the count of available FORMAT 0 DSCBs may be set to zero. The Format 5 may be set to indicate that there is no free space, and the indexed VTOC, if any, is disabled.

The data tracks are now restored from the backup to their new locations on the disk. The data is in cylinder and head sequence on the backup according to the old locations of the data sets.

After the data is restored, COMPAKTOR will reset the Format 4, re-build the free space pointers and issue the restore completed message (CPK322I). The volume is now usable again.

Finally, the VTOC index is rebuilt (if necessary) and the UCB is updated.

If the volume is accessed after a failure during the restore phase, between the CPK321I and CPK322I messages, certain functions may seem normal. Any data sets which were unmovable or completely restored will be accessible. However, all others may list normally in the VTOC but their data has not been relocated. There is no easy way to tell which datasets have been restored and which have not. Users may not be able to allocate new data sets on the volume. In addition, the volume may not be mountable during IPL, or on a shared system.

**COMPAKT-from-backup with DUMP=YES should never be restarted after a failure in the restore phase. The safest procedure is to do an FDR full volume restore from the backup created during the COMPAKTion.**

Normally an FDR restore can be executed after a failed COMPAKTion during the restore phase. If FDR abends with an Sx13 on the VTOC, a re-initialization of the volume is required, prior to the restore.

If you were COMPAKTing an active volume (that is, if the operator replied IGNORE to message FDRW81 or if the COMPAKT command specified ACTMESS=NO) and there were data sets being updated during COMPAKTion, recovery is more difficult. If a full volume restore is not desirable, you can restore any data set which was relocated, from the backup tape. A DSF restore should be used specifying EXCLUDE for all of the data sets which were updated (data sets may have been updated if they were listed in FDR158 messages, or are included in the COMPAKTOR unmovable table) followed by a SELECT ALLDSN. To reset the VTOC the user sets the DOS flag x '80' in the DS4VTOCI field (disp. 58(X '3A')) using SUPERZAP. The operating system will recalculate the free space and free entries within the VTOC once a data set is allocated to the volume. The VTOC index, if present, must be rebuilt by using ICKDSF.

If COMPAKTOR is restarted after a failure during the restore phase, with DUMP=YES, you risk overwriting the very backup you need for the restore. The dump will take place and usually COMPAKTOR will issue the message CPK556W UNABLE TO IMPROVE. If the operator mounts the same volumes (Tape Management Systems may allow the rewrite with the same data set name), the new backup will be rewritten over these volumes.

A duplicate tape copy (TAPE11) is recommended in the event the first copy is damaged during the restore phase. The restore can then be done from the duplicate copy.

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## 40.23 CONTINUED . . .

**RESTARTING  
FAST  
COMPAKTION**

A Fast COMPAKTion (TYPE=FASTCPK) goes through many of the same steps described earlier in this section for COMPAKT-from-backup. However, Fast COMPAKTion simply moves tracks on the volume until all tracks have reached their target locations. During this process, a failure may leave the volume in a corrupted state since the VTOC may not point to the current locations of the data for many datasets.

FAST COMPAKTion includes an automatic recovery function. At the point that movement of data actually begins, a recovery data set is allocated on the volume with the name:

COMPAKT.IN.PROGRESS.OR.RECOVERY.Dyyddd.Thhmm

which is a few tracks in length (depending on the number of tracks being moved). “yyddd” is the Julian date the data movement started and “hhmm” is the starting time. The recovery dataset has an extent which overlaps the VTOC; this is normal. If you see this dataset in the VTOC of a volume, and there is no Fast COMPAKTion running against that volume, then a Fast COMPAKTion failed and the volume is in recovery status. If you run any COMPAKTOR function against a volume in recovery status (even a MAP) you will receive a CPK586W message warning you that recovery is required (only MAP and Fast COMPAKTion will be allowed to complete).

As it proceeds, Fast COMPAKTion records restart information in that recovery dataset. If the Fast COMPAKTion is interrupted, you simply need to rerun a Fast COMPAKTion against that volume; COMPAKTOR will recognize that it was interrupted and automatically restarts. Usually it will recover by reversing the track movement to return all tracks to their original locations as if the COMPAKTion had never been done. If it failed in the final stages of its operation, it will attempt to complete the data movement.

**You must restart the Fast COMPAKTion as soon as possible after the interruption.**

Except for datasets that were active at the start of the original Fast COMPAKTion and other datasets that were not moved, the volume will not be usable until COMPAKTOR is allowed to complete. To ensure that no new datasets are allocated or old datasets extended (which might make recovery impossible), COMPAKTOR will change the VTOC and VTOC INDEX (if present)

to indicate that there are no free tracks on the volume, until the COMPAKTion successfully completes. You must not attempt any corrective operations of your own on the volume, since this may result in permanent loss of data.

If I/O errors occur during Fast COMPAKTion, COMPAKTOR will immediately go into recovery mode and attempt to return the volume to its original configuration.

**RESTARTING  
SPACE  
RELEASE**

Since COMPAKTOR space release (TYPE=RLSE) does not move any data, but simply updates the VTOC and VVDS to indicate released space, the release job can simply be restarted.

**CANCEL  
PROTECTION**

Since the majority of interrupted COMPAKTOR jobs result from operators issuing CANCEL commands, COMPAKTOR now includes a CANCEL protection function. If a CANCEL is issued against a COMPAKTOR job at any time during the restore phase (while the VTOC, VVDS, or data tracks are actually being updated, moved, or restored), COMPAKTOR will intercept that CANCEL and issue an FDRW99 Message to the operator indicating that the CANCEL will result in volume corruption, and giving the operator the option of ignoring the CANCEL, cancelling the job, or bringing COMPAKTOR to a graceful termination when it finishes processing the current volume. The operator should select the option to cancel the job only if COMPAKTOR appears to be in a loop.

With CANCEL eliminated as a cause of interruptions, only hardware and software system failures remain as potential sources of interruptions, and these are increasingly rare.

**40.24 COMPAKTING ACTIVE VOLUMES**

Although COMPAKTOR enqueues on the VTOC of the target volume and checks the use count for the device in the UCB, some system data sets are opened when the Operating System is initialized; they are not all accounted for by the UCB use count.

**ACTIVE  
DATA SETS**

The following data sets are a partial list of active data sets which may not be enqueued by the operating system so that COMPAKTOR is unable to tell if they are in use. If applicable, these data sets and any other data sets which are not enqueued should be put in the unmovable table. Failure to do so may result in system failures.

— Add These data sets to the COMPAKTOR unmovable table —

DATA SETS CONCATENATED TO SYS1.LINKLIB VIA LNKLISTxx \*  
 JES PROCEDURE LIBRARIES (PROCLIBS)  
 JES SPOOL and CHECKPOINT DATA SETS  
 TAPE MANAGEMENT SYSTEM DATA SETS  
 SYS1.BROADCAST  
 SYS1.MANx (SMF) DATA SETS  
 OS CVOL CATALOGS (SYSCTLG)  
 SECURITY SYSTEM DATASETS  
 FDR/CPK PROGRAM LIBRARY

\* On XA and ESA systems, COMPAKTOR V5.2 and above will automatically make linklist datasets unmovable.

**DATA SET  
ENQUEUE**

When COMPAKT-from-backup is executed with DUMP=YES, FDR will determine which data sets are active if the data set enqueue option (DSNENQ=) is specified on the DUMP TYPE=FDR statement. A data set is considered active if it is enqueued with a QNAME of 'SYSDSN' and an RNAME of the data set name. This is the enqueue used by the job scheduler. In addition, ICF VSAM catalogs, page and swap data sets, and the VVDS are always considered active with this option.

However, there is one circumstance in which you do NOT want to specify DSNENQ=. The ENQs done by the operating system are strictly on the dataset name; it is not possible to tell on which volume the dataset in use resides. If you are COMPAKTING a volume which is a duplicate of another active volume (such as when you are creating a duplicate SYSRES volume), DSNENQ= would consider any datasets which were in use on the original volume to be unmovable on the duplicate volume, even though they are not really in use. If DSNENQ= is omitted, COMPAKTOR will be able to do a better job of COMPAKTING the duplicate volume.

For FAST COMPAKTion (TYPE=FASTCPK) and space release (TYPE=RLSE) the DSNENQ= operand is supported on the COMPAKT statement. However, it defaults to DSNENQ=USE so these operations automatically recognize active data sets.

**UNMOVABLE  
DATA SETS**

COMPAKTOR supports a table of unmovable data sets. SYS1.VTOCIX, SYS1.VVDS and SYS1.LOGREC are automatically included in this table. The user may specify additional data set names or groups to be considered unmovable. Entries can be added to this table using the

FDR/ABR ISPF support ([Section 92](#)) or by executing program FDRZAPOP ([Section 91](#)). Data sets specified by the unmovable table or POS=KEEP or found active by the data set enqueue option will not be moved or restored by COMPAKTion using the DUMP=YES option.

**NOTE: OVERRIDE=YES enables the user to move data sets in the unmovable table or active data sets.**

**SYSRES** COMPAKTOR will not allow you to COMPAKT on top of an active system residence volume.

CONTINUED . . .

## 40.24 CONTINUED . . .

**COMPAKTING  
ACTIVE  
VOLUMES**

However, if you must COMPAKT a volume which has data sets in constant use, you can do so. FAST COMPAKTion (TYPE=FASTCPK) is designed to process active volumes by default. Do not override the default of DSNENQ=USE. This also applies to space release (TYPE=RLSE).

For COMPAKT-from-backup (TYPE=COMPAKT specified or defaulted) the procedure is as follows:

Specify **DUMP=YES** on the **COMPAKT** command, or run **COMPAKTOR** under **PGM=FDR** or **PGM=FDRABR** by specifying **COMPAKT** on the **DUMP TYPE=FDR** command.

Do not override the default of **ENQ=RESERVE**.

Do not specify **TODD=** or **VTOC=COMPAKT**.

Specify **DSNENQ=USE** or **DSNENQ=HAVE** on the FDR DUMP statement.

Any other active data sets which are not unmovable and cannot be identified using the DSNENQ option must be named in the COMPAKTOR unmovable table or in **SELECT** commands specifying **POS=KEEP**.

These data sets and unmovable data sets will be dumped to the backup tape, but will not be restored by **COMPAKTOR**, and will not be disturbed by COMPAKTion.

Reply '**IGNORE**' when the **FDRW81** informs you that open data sets exist on the volume.

This message will still be issued with the data set enqueue option unless ACTMESS=NO is specified on the CPK control statement or in the FDR option table.

**OVERRIDING  
THE  
UNMOVABLE  
TABLE OR  
ACTIVE LIST**

Normally COMPAKTOR will abend if a SELECT DSN= control statement was specified for a data set found in the unmovable table or found to be active by the data set enqueue option. If OVERRIDE=YES is specified on the CPK control statement or in the COMPAKTOR unmovable table SELECT control statements will be honored for these datasets unless the data set is truly unmovable. This should be done with care. For example: ICF VSAM catalogs may remain OPEN for a considerable period of time. If they are moved while OPEN, the results are unpredictable. If an active tape management or linklist data set is moved, the system will probably crash.

**WARNING: If the SYS1.VVDS, PAGE, SWAP or ICF catalogs are moved, you must vary the volume offline and remount the volume after COMPAKTion on all the CPUs which can reference this volume including the one CPK was run on. If this is not done and any of these data sets were previously opened by the system, VSAM will continue to use the old location.**

The DSNENQ= option will cause COMPAKTOR to consider page,swap,and ICF catalogs to be unmovable.

**SIMULATION  
OF AN ACTIVE  
VOLUME**

If a SIMULATE is executed against an active volume, CPK will NOT check for active data sets, or the special ICF VSAM data sets (Catalog, Swap or Page). The unmovable table will be checked. Simulation may indicate that these data sets will move when, in fact, they will not move during a live COMPAKTion if DSNENQ= is specified on the DUMP statement.

## 40.24 CONTINUED . . .

**ERRONEOUS  
UCB COUNT****QUESTION:**

COMPAKTOR indicates an open data set is on the volume and nothing is running in the system.

**ANSWER:**

1. The first time a VSAM user catalog is referenced after IPL, it is OPENed and the count in the UCB is incremented. (This applies whether the reference is explicit or just from Allocation locating a cataloged data set). On some levels of the operating system, user catalogs are never CLOSEd. Therefore, if you want to COMPAKT a volume containing a VSAM user catalog without getting the VOLUME IN USE message, it will sometimes be necessary to run COMPAKTOR as the first job after an IPL. On recent systems, console MODIFY commands may be used to close open catalogs.
2. The cataloged procedure libraries used by JES2 and JES3 cause the count of open DCBs to be incremented. If you want to COMPAKT a volume that contains a PROCLIB, without getting the VOLUME IN USE message, you may have to run under a JES2/JES3 procedure (or equivalent) that omits that PROCLIB.
3. Paging data sets are another possible cause of the use count being incremented. COMPAKTOR always issues the "in use" message if the UCB indicates that the volume is being used for paging (bit x '40' at UCB\$AR34 (X '22')).
4. COMPAKTOR issues the "in use" message if you try to COMPAKT SYSRES. COMPAKTion of the active system residence volume is never permitted.
5. If your Operating System is MVS/SP 1.3.x or MVS/XA, or MVS/ESA, you can use the command

D U, , ALLOC, uuu, 1

to find out what jobs are considered to have the device allocated, where uuu is the device address.

**40.25 COMPAKTOR REPORTS**

**EXTENTS MAP** COMPAKTOR produces a map showing all of the data sets and free spaces on the volume in sequence by location. For SIMULATE and COMPAKT, maps are produced showing the condition of the volume both BEFORE and AFTER the operation. The map shows the data set name, the location and size of each extent, and the extent number and total number of extents. For the first extent of a data set, the map shows the data set organization, the type and quantity of secondary allocation, the last block pointer, the total size of the data set, and how much of the allocated space is unused.

COMPAKTOR normally will highlight the lines for the VTOC and the free spaces, to make them stand out more. (If you plan to look at the map from a terminal, we recommend that you specify HIGHLIGHT=NO, because the highlighting would appear as duplicated lines).

For non-VSAM datasets, the LAST BLK TTR points to the highest used record in the dataset; the first 4 digits are the highest used track (in hex, relative to zero) and the last 2 digits are the highest record number on that track (in hex). EMPTY TRKS is based on the total allocation minus the used tracks for PS and PO datasets.

For ICF VSAM components the LAST BLK TTR contains generated information. The first 4 digits are the last track of the highest used Control Area (in hex, relative to zero) in the cluster as derived from the HI-USED-RBA value in the VVDS entry for the cluster and the last 2 digits are the number of tracks per CA (Control Area), in hex, except the hi-order X '80' flag will be on to indicate that COMPAKTOR was unable to move or release space on this component. If the TTR contains non-zero data, then EMPTY TRKS will indicate unused tracks in the cluster. These values may be zero for ICF VSAM components in the AFTER MAP.

See the following page for a sample COMPAKTion Extent Map.

For volumes with more than 64K tracks, such as the 3390-9, the map is in a slightly different format with starting and ending cylinders on the left, and 5-digit cylinder numbers. The MAPFORMAT=NEW operand can force this format even on smaller disks.

40.25 CONTINUED . . .

## SAMPLE COMPAKTOR CONTROL CARDS

```

● CPK301I  I NNOVATI ON DATA PROCESSI NG - COMPAKTOR VER.  5. 2/30P      MESSAGES      DATE 93.274 TIME 08.34.02 PAGE 1
● CPK305I  CARD  -- * SI M   TYPE=CPK, VOL=CLS005, ACTMESS=NO, VSR=ALL,
CPK305I  CARD  -- *           SI ZEKEEP=0
● CPK306I  CARD  -- *           LOG=YES, CONFMESS=NO

```

## BEFORE COMPAKTION

```

● CPK301I  I NNOVATI ON DATA PROCESSI NG - COMPAKTOR VER.  5. 2/30P      EXTENTS MAP OF      DATE 93.274 TIME 08.34.02 PAGE 1
●                                     VOLUME CLS005 BEFORE COMPAKTION
START  END  EXTENT
● TRACK TRACK LENGTH  D A T A   S E T   N A M E      EXTENT ORG ALLOC ALLOC TTR(HEX) TRKS. TRKS. CC-HH  CC-HH
00000 00000   1 *** IPL AND LABEL RECORDS ***      0000-00 0000-00
● 00001 00089   89 *** VTOC ***                      01/01
00090 00134   45 SYS1. VTOCI X. CLS005                01/01 PS TRK      0 002C12   45   0 0008-00 0008-14
● 00135 00179   45 SYS1. VVDS. VCLS005                01/01 EF TRK      0 002C81   45   0 0009-00 0011-14
00180 04754 4575 PAS1612. P. TSC. ACTI VI TY. D      01/01 EF CYL      5 11C08F 4575   0 0012-00 0316-14
● 04755 07544 2790 FLX4061. P. OL. TRANSACT. D      01/01 EF CYL     20 0AE50F 2790  30 0317-00 0502-14
07545 10229 2685 FLX0860. P. OL. ENROLLMN. D      01/01 EF CYL     20 0A7C0F 2685   0 0503-00 0681-14
● 10230 12254 2025 FLX2378. P. OL. ENROLLMN. D      01/01 EF CYL     20 07E80F 2025   0 0682-00 0816-14
12255 14234 1980 FLX1488. P. OL. BALANCE. D      01/01 EF CYL     20 07B80F 1980   0 0817-00 0948-14

```

## AFTER COMPAKTION

```

● CPK301I  I NNOVATI ON DATA PROCESSI NG - COMPAKTOR VER.  5. 2/30P      EXTENTS MAP OF      DATE 93.274 TIME 08.34.02 PAGE 1
●                                     VOLUME CLS005 AFTER COMPAKTION
START  END  EXTENT
● TRACK TRACK LENGTH  D A T A   S E T   N A M E      EXTENT ORG ALLOC ALLOC TTR(HEX) TRKS. TRKS. CC-HH  CC-HH
00000 00000   1 *** IPL AND LABEL RECORDS ***      0000-00 0000-00
● 00001 00089   89 *** VTOC ***                      01/01
00090 00134   45 SYS1. VTOCI X. CLS005                01/01 PS TRK      0 002C12   45   0 0008-00 0008-14
● 00135 00179   45 SYS1. VVDS. VCLS005                01/01 EF TRK      0 002C81   45   0 0009-00 0011-14
00180 02204 2025 FLX2378. P. OL. ENROLLMN. D      01/03 EF CYL     20 07E80F 5655  3630 0012-00 0146-14
● 02205 05534 3330 FLX2378. P. OL. ENROLLMN. D      02/03
05535 05834 300 FLX2378. P. OL. ENROLLMN. D      03/03
● 05835 06254 420 PAS1612. P. TSC. ACTIVITY. D      01/31 EF CYL      5 11C08F 4575   30 0389-00 0416-14
06255 06764 510 PAS1612. P. TSC. ACTIVITY. D      02/31
●                                     0417-00 0450-14

```

CONTINUED . . .

## 40.25 CONTINUED . . .

**SUMMARY** COMPAKTOR produces a summary showing many statistics for the volume. For SIMULATE and COMPAKT, two columns show the statistics BEFORE and AFTER the operation. There are statistics for the volume as a whole, for various categories of data sets, and for the VTOC.

Some uses of the summary map are discussed in [Section 40.18](#).

CPK301I INNOVATION DATA PROCESSING - COMPAKTOR VER. 5.2/30P		SUMMARY	MAP OF
		VOLUME	CLS005
VOLUME SUMMARY ---	DEVICE TYPE . . . . .	3380-K	3380-K
	NO. OF TRACKS . . . . .	39825	39825
	NO. OF CYLINDERS . . . . .	2655	2655
	NO. OF TRACKS PER CYLINDER . . . . .	15	15
	NO. OF ALLOCATED TRACKS . . . . .	37889	27184
	NO. OF ALLOCATED EXTENTS . . . . .	193	101
	NO. OF UNMOVEABLE EXTENTS . . . . .	2	2
	NO. OF FREE TRACKS . . . . .	1936	12641
	NO. OF FREE CYLINDERS . . . . .	127	824
	NO. OF FREE SPACE AREAS . . . . .	6	1
	SIZE OF LARGEST FREE AREA, IN TRACKS . . . . .	1035	12641
	PERCENTAGE OF VOLUME IN USE . . . . .	95	68
	IBM FRAGMENTATION INDEX . . . . .	0.257	0.000
DATASET SUMMARY --	NO. OF EMPTY TRACKS IN PS DATA SETS . . . . .	0	0
	NO. OF EMPTY TRACKS IN PO DATA SETS . . . . .	498	498
	NO. OF EMPTY TRACKS IN VSAM DATA SETS . . . . .	11960	1255
	NO. OF PS DATA SETS WITH EMPTY TRACKS . . . . .	0	0
	NO. OF PO DATA SETS WITH EMPTY TRACKS . . . . .	5	5
	NO. OF UNMOVEABLE DATA SETS . . . . .	2	2
	NO. OF DATA SETS WITH 2 OR MORE EXTENTS . . . . .	11	0
	NO. OF DATA SETS WITH SUL TRACKS . . . . .	0	0
	NO. OF TEMPORARY DATA SETS . . . . .	0	0
	NO. OF DATA SETS -- IS ORGANIZATION . . . . .	0	0
	NO. OF DATA SETS -- PS ORGANIZATION . . . . .	1	1
	NO. OF DATA SETS -- PO ORGANIZATION . . . . .	5	5
	NO. OF DATA SETS -- DA ORGANIZATION . . . . .	0	0
	NO. OF DATA SETS -- AM ORGANIZATION . . . . .	0	0
	NO. OF DATA SETS -- EF ORGANIZATION . . . . .	94	94
	NO. OF DATA SETS -- ** ORGANIZATION . . . . .	0	0
	NO. OF DATA SETS -- TOTAL . . . . .	100	100
VTOC SUMMARY -----	VTOC IS AT RELATIVE TRACK . . . . .	1	1
	VTOC SIZE IN TRACKS . . . . .	89	89
	NO. OF UNUSED VTOC TRACKS . . . . .	86	87
	NO. OF DSCBS PER TRACK . . . . .	53	53
	NO. OF MODEL DSCBS . . . . .	1	1
	NO. OF FORMAT 0 DSCBS . . . . .	4605	4614
	NO. OF FORMAT 1 DSCBS . . . . .	101	101
	NO. OF FORMAT 2 DSCBS . . . . .	0	0
	NO. OF FORMAT 3 DSCBS . . . . .	9	0
	NO. OF FORMAT 4 DSCBS . . . . .	1	1
	NO. OF FORMAT 5 DSCBS . . . . .	1	1
	NO. OF FORMAT 7 DSCBS . . . . .	0	0
	NO. OF DSCBS -- TOTAL . . . . .	4717	4717
	NO. OF DSCBS IN USE . . . . .	112	103
	PERCENTAGE OF DSCBS IN USE . . . . .	2	2
*** END OF SUMMARY MAP ***			

- ① Reduced 6 free space areas to one.
- ② Largest free area significantly increased.
- ③ Releasing space over in allocated VSAM data sets.

CONTINUED . . .

## 40.25 CONTINUED . . .

**COMBINED  
SUMMARY**

COMPAKTOR produces a combined summary, with 2 lines (before and after) with selected statistics from the summary of each volume processed, sorted by volser. Only 1 line is printed for MAP. The combined summary is printed on DDname SYSSUMM, if present, or at the end of SYSMAP if not.

Here is a sample combined summary.

CPK3011	INNOVATI ON	DATA	PROCESSING	COMPAKTOR	VER.	5. 2/30P	COMBI NED SUMMARY					DATE	93. 145	TIME	11. 32. 16	PAGE			
		NUMBER	OF	>1 --	ALLOCATED	---	-----	FREE	-----	FRAG	-	EMPTY	TRACKS	I N	-	VTOC	-	TIME	COMP
VOLSER	DEVTYPE	TRACKS	DSNS	EXTS	TRACKS	EXTS	%AL	TRACKS	AREAS	LARGEST	I NDEX	VSAM	PS	PO	SIZE	%US	(MI N)	CODE	
I DPBKO	3380	13275	31	0	1730	32	13	11545	7	5610	0. 161	0	0	0	15	4			
--AFTER	CPK-->		31	0	1730	32	13	11545	2	5773	0. 082	0	0	0	15	4	. 6	0	
I DPLBO	3380	13275	104	9	8084	132	61	5191	31	2651	0. 232	16	2	1367	15	15			
--AFTER	CPK-->		104	0	8084	105	61	5191	1	5191	0. 000	16	2	1367	15	15	1. 1	0	
I DPLB1	3380-K	39825	365	38	32251	493	81	7574	48	2051	0. 243	48	416	5242	15	48			
--AFTER	CPK-->		365	3	32251	366	81	7574	1	7574	0. 000	48	416	5242	15	47	3. 9	0	
I DPLB5	3380-K	39825	458	49	38650	615	97	1175	82	130	0. 615	668	160	4422	15	61			
--AFTER	CPK-->		458	2	38650	462	84	6285	2	5988	0. 043	50	0	90	15	58	5. 9	0	
I PLXA2	3380	13275	117	0	9557	118	72	3718	2	2002	0. 095	2307	0	1397	15	15		NO	
--AFTER	CPK-->		117	0	9557	118	72	3718	2	2002	0. 095	2307	0	1397	15	15	. 2	IMPRV	
SMSLBO	3380	13275	351	3	10279	364	77	2996	32	1650	0. 213	2532	374	53	15	45			
--AFTER	CPK-->		351	0	10279	364	77	2996	2	1503	0. 098	2532	374	53	15	45	2. 9	0	
TSOWK1	3380	13275	249	7	7591	268	57	5684	31	2205	0. 178	0	119	268	10	48			
--AFTER	CPK-->		140	0	7482	141	56	5793	2	2909	0. 090	0	119	268	10	48	1. 6	0	
CPK RELEASED 11382 TRKS AND ELI MI NATED 602 FREE SPACE AREAS FROM 37 VOLUMES WITH 685736 TRKS (44% WAS ALLOCATED)																			
*** END OF SUMMARY MAP***																			

Many of these fields are extracted from the SUMMARY REPORT on the previous page, and are described in [Section 40.18](#). Some are unique to this report. Briefly, the fields are:

**NUMBER OF TRACKS**

Total tracks on the volume

**NUMBER OF DSNS**

Total data sets on the volume

**>1 EXTS**

Number of data sets with more than one extent

**ALLOCATED TRACKS**

Total allocated tracks

**ALLOCATED EXTS**

Total allocated extents

**ALLOCATED %AL**

Percentage of total tracks allocated

**FREE TRACKS**

Total tracks not allocated

**FREE AREAS**

Number of free space areas

**FREE LARGEST**

Largest free area size in tracks

**FRAG INDEX**

IBM fragmentation index

**EMPTY TRACKS IN..**

Total unused tracks in VSAM, PS, and PO data sets

**VTOC SIZE**

Total size of the VTOC in tracks

**VTOC %US**

Percentage of the VTOC DSCBs in use

**TIME**

CPK elapsed time in minutes (and tenths if less than 99 minutes)  
For simulation of FAST COMPAKTion (SIM TYPE=FASTCPK)  
only, this will be a conservative estimate; the actual elapsed time  
will usually be less.

**COMP CODE**

CPK completion on this volume

0 - successful COMPAKTion

ERROR - an error occurred; look for messages

NO IMPRV - unable to improve the volume

BY PASS - conditional keywords bypassed volume

IN RECVY - FAST CPK previously failed; rerun CPK



**40.26 RECOMMENDATIONS FOR COMPAKTOR USE**

For installations that wish to make scheduled, automated use of COMPAKTOR, Innovation has several recommendations.

If you are currently executing COMPAKTOR under FDR or ABR as part of full-volume backups (the COMPAKT option on the DUMP statement), we recommend that you remove COMPAKTOR from FDR/ABR and instead set up a separate FAST COMPAKTion step or job to run immediately before or after the full-volume backups. FAST COMPAKTion will run considerably faster than COMPAKTion-from-backup since no tape manipulation is required.

Since the full-volume backups are most often run on weekends, when time for backups and COMPAKTions are usually not constrained, we recommend that you run FAST COMPAKTion with parameters which will get the maximum benefit by making all possible data sets eligible to move. For example,

```
//FASTCPK      EXEC   PGM=FDRCPK, REGI ON=4M
//SYSPRI NT    DD     SYSOUT=*
//SYSMAP       DD     SYSOUT=*
//SYSSUMM      DD     SYSOUT=**
//CPKWORK      DD     UNI T=SYSDA, SPACE=(CYL, 1)
//SYSI N       DD     *
               COMPACT TYPE=FASTCPK,
SIZEKEEP=(0, 100, 1), VOL=*      (see note below)
```

If you have some time constraints even on the weekends, you can reduce COMPAKTOR^S elapsed time while still getting most of its benefits with the same JCL and this control statement:

```
COMPACT TYPE=FASTCPK,CPKFRAGI=2,
CPKFREEEX=10,VOL=*      (see note below)
```

which will only COMPAKT volumes with a fragmentation index over .200 or more than 10 free space areas, and will apply the default SIZEKEEP values which may reduce the number of tracks COMPAKTOR must move.

On weekdays you may wish to automate the COMPAKTion of selected volumes which are badly fragmented with the same JCL and this control statement:

```
COMPACT TYPE=FASTCPK, CPKFRAGI =350, CPKFREEEX=50,
MI NRLSE=100, PSRLSE=ALL, PORLSE=ALL, %POFREE=20,
SI ZEKEEP=( 100, 70, 60), VOL=( TSO*, TEST*)
```

The SIZEKEEP= operand requires COMPAKTOR to achieve only a 70% reduction in the number of free space areas, which should reduce its elapsed time. FAST COMPAKTion automatically handles active volumes and will not move any active data sets. You may wish to run this in simulation to see which volumes will be selected and to experiment with different values for the operands.

Space release operands shown in this example are optional; you should consider if you want to release space from data sets on a regular basis.

You may also wish to use a similar statement to produce daily management reports on volumes that may need COMPAKTion:

```
SIM TYPE=FASTCPK,CPKFRAGI=350,CPKFREEEX=50,MAPS=SUMMARY,
SIZEKEEP=(100,70,60),VOL=*      (see note below)
```

NOTE: The VOL=\* operand will select ALL online disk volumes. You can change it to select only certain groups of volumes (as shown in the third example above) or you may exclude certain volumes or volume groups from COMPAKTOR processing by entries in the COMPAKTOR Unmovable Table as shown in [Section 40.04](#).

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# ABR<sup>®</sup>

AUTOMATIC BACKUP & RECOVERY  
USER DOCUMENTATION

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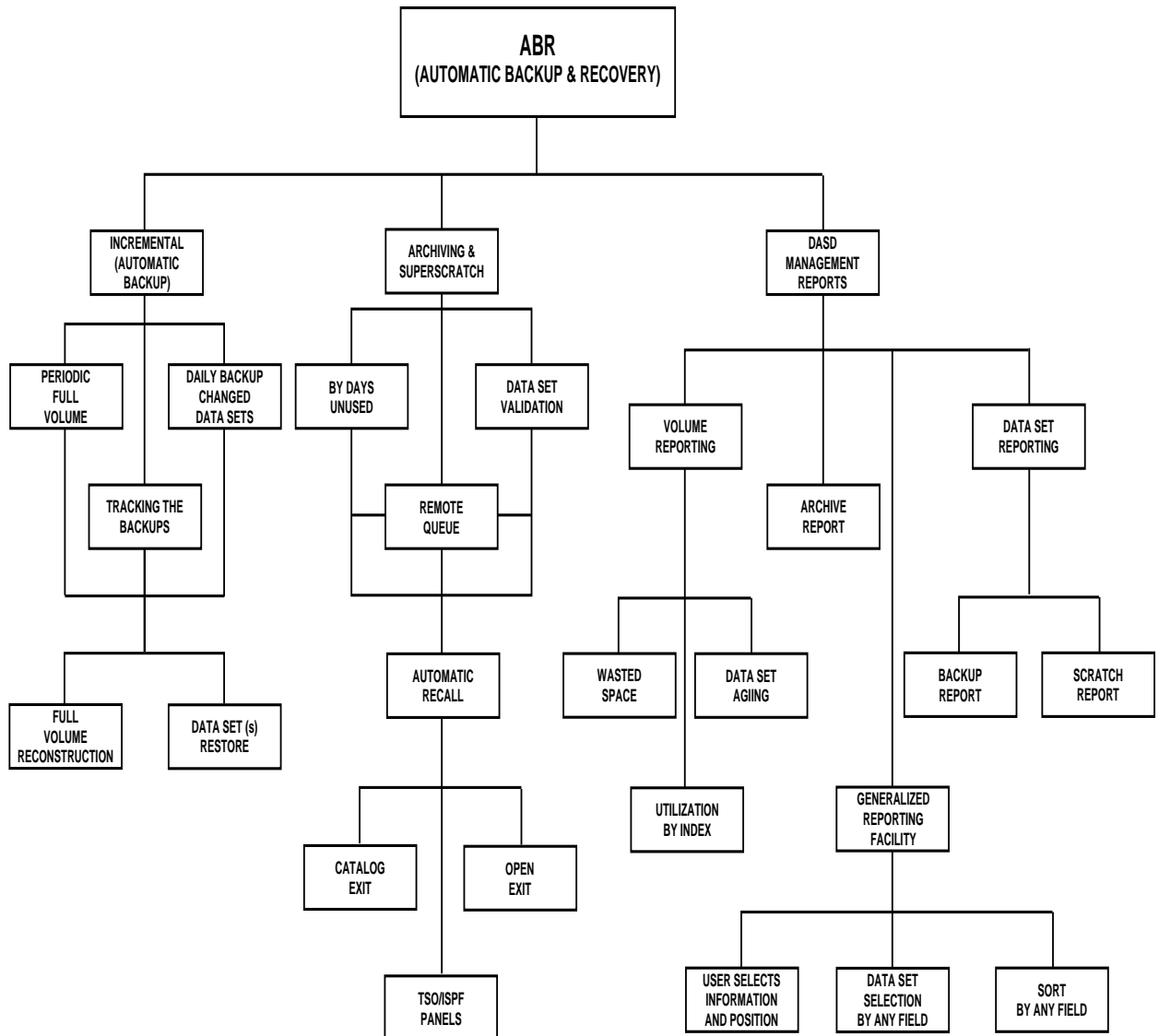
## 50.01 ABR OVERVIEW

ABR provides an efficient and easy-to-use method of managing the space on direct access volumes. Disk volume and data set backup can be automated, based on when a data set was last updated. Usually only a small number of the data sets on a disk volume are updated each day. Dumping only the changed data sets will decrease the time window necessary for the daily backups. At the same time you have a current backup of every data set that has changed.

Data sets which have not been used for a time period can be automatically moved to archive backups, freeing the disk space for more productive use. If a user references an archived data set, ABR will automatically recall the data set.

Extensive reporting facilities are provided by ABR to aid the user in the management of DASD space.

ABR is simple to use without sacrificing capability. For TSO users, extensive ISPF/PDF panels are supplied. As with all of the INNOVATION products, ABR has been designed for both reliability and performance.

ABR FLOW  
CHART

CONTINUED . . .

## 50.01 CONTINUED . . .

**FORMAT OF  
ABR MANUAL**

The ABR manual is broken down by major functions. Each major function is contained within a section.

The ABR sections are as follows:

- SECTION 50** – Full Volume and Incremental Backup.Data Set Restore from the Backup Sub-system. Full Volume Restores.
- SECTION 51** – ARCHIVE and SUPERSCRATCH data sets.Data Set Restore from the ARCHIVE Sub-system.
- SECTION 52** – Special Considerations for FDR, CPK or ABR.
- SECTION 53** – ABR Reporting Facilities. Generalized Reporting Facility (FDREPORT).
- SECTION 54** – ABR Remote Queue for ARCHIVE, BACKUP and RESTORE Requests.(machine readable only)
- SECTION 55** – ABR Initialization and Maintenance for the ABR Model DSCB, ARCHIVE Control File and SCRATCH and BACKUP Catalog.
- SECTION 56** – ABR's TSO/ISPF PANELS
- SECTION 80** – Messages and Codes.
- SECTION 90** – Installation of the FDR/CPK/ABR Library. Operating System Exits. Establishing the ABR Catalog, ABR model DSCBs and ARCHIVE control file.
- SECTION 91** – Global Change Facility (FDRZAPOP) and User Exits.
- SECTION 92** – Interactive FDR/CPK/ABR install and dynamic install of operating system exits.

**FDRABR**

One program, FDRABR, is executed for all BACKUP, ARCHIVE, and RESTORE functions. A few other programs are used for reporting, remote queue, initialization, and maintenance. The installation establishes the environment and rules ABR is to follow on each disk volume. Many of these procedures can be overridden by the user at execution time.

The user can perform simulations of the incremental backup and archive operations. ABR will display the data sets selected for a given operation. On simulated restore operations, the data sets selected and the backup volume serial numbers are displayed.

ABR uses the standard FDR and DSF programs to perform the backup and restore operations. The actual dump or restore of a disk volume or data set(s) is executed as a subtask. These subtasks enable ABR to continue the entire operation requested, even if one or more sub-operations terminate abnormally.

**PERFOR-  
MANCE CON-  
SIDERATION**

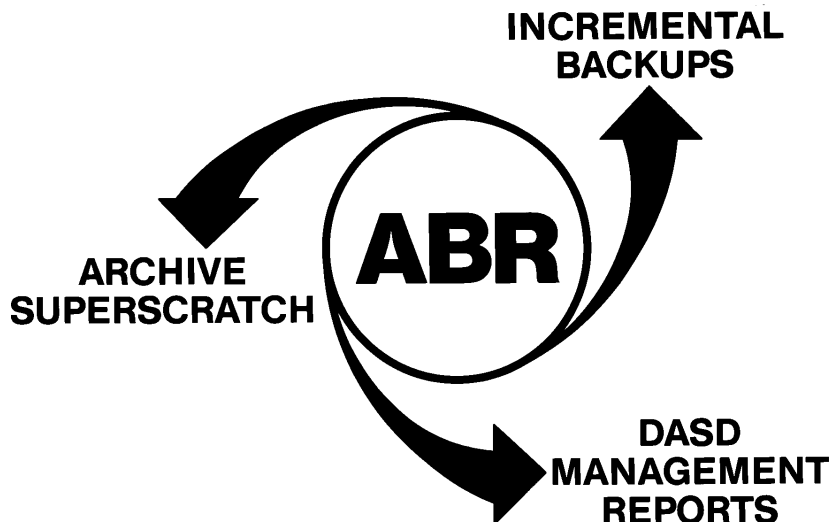
ABR's performance versus other DASD Management systems.

Most DASD Management systems backup data sets logically (reading by record or block). This technique can be very time consuming. Optionally, they may offer an image copy of the data set, however you may lose certain capabilities (such as unlike device restore). In addition, they consume large amounts of system resources (CPU time, paging impact, EXCPs, program size etc.) in managing the backups or archives.

ABR is designed to backup data sets or volumes by track image, without sacrificing capability (such as unlike restore). ABR uses only a small amount of overhead in the management of the backups versus backing up the data with FDR and FDRDSF.

**If you already have a DASD Management system, can you afford to run ABR can reduce the backup time and system overhead by 30 to 90%, compared to other DASD Management systems.**

## 50.02 ABR FEATURES



**FEATURES** The FDR/ABR DASD MANAGEMENT SYSTEM is composed of three major subsystems: INCREMENTAL BACKUPS, ARCHIVING and DASD MANAGEMENT REPORTING.

**INCREMENTAL BACKUP** — is the process of making a copy of disk data sets so that you can recover them if they are damaged. At some interval, typically once a day, the computer center runs an ABR incremental backup of the disk volumes. The backup job automatically selects for backup all data sets that have been changed since the last time the job ran. So, on each day that a data set is changed, ABR will make a new backup copy; therefore if something goes wrong, you will not lose more than one day's work.

At some interval (usually once a week), the user can instruct ABR to take a full volume backup. This can be done automatically (after a certain number of incremental backups) or manually. The ABR techniques of incremental and full volume backups gives the user the capability of both data set and volume reconstruction.

**ARCHIVING & SUPERSCRATCH** — is the process of removing data sets from disk, and putting them instead onto a less expensive storage medium, such as tape. ABR enables the installation to make a variety of rules about when a data set is considered to be 'not needed on disk'. A simple rule would be that any data set that has not been used at all for a period of thirty (30) days will be archived.

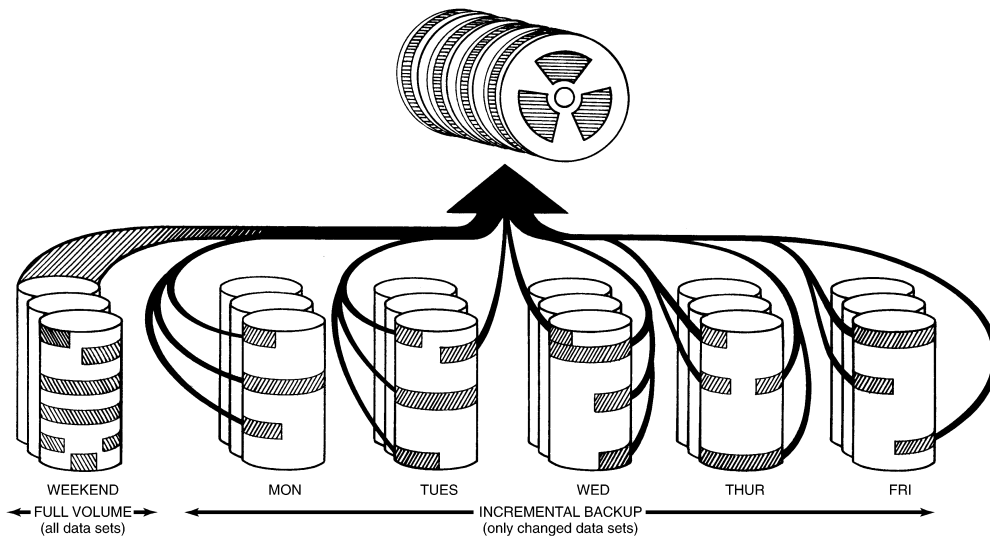
ABR keeps track of the archived data sets in a data base called the Archive Control File.

ABR can create the backup of archived data sets on both disk and tape at the same time. It is recommended that the backup on disk be retained for a short period of time (usually 30 to 90 days). The backup on tape should be kept for a longer period of time based on installation needs (usually 1 year). If an archived data set is referenced by a user (in batch or TSO), ABR will automatically recall the data set (if the operating system exits are in place). If the backup copy on disk has not expired, ABR will restore from the disk backup without operator intervention. If the backup on disk has expired, ABR will call for the backup on tape. Once the data set is restored, the job will continue normally.

**DASD MANAGEMENT REPORTING** — ABR gives the user extensive reporting capabilities. The reports reflect both the status of the DASD volumes and the backups and archives contained within the ABR system. ABR supplies a number of standard report formats, or the user may customize his or her own report. The reports are automatically formatted for the output medium (print or CRTs).

CONTINUED . . .

## 50.02 CONTINUED . . .

**INCREMENTAL BACKUPS**

- . . . **INCREMENTAL BACKUPS.** ABR uses the Update Indicator set by the MVS system. The operating system will set the update flag in the Format 1 DSCB each time the data set is opened for output or update. ABR will reset the update flag each time the data set is dumped. Therefore, ABR will only dump the data set when it has changed between backups.
- . . . **ICF VSAM.** ABR can backup ICF VSAM files based on the update indicator or control statement criteria. If the update indicator is on for the data component or any other component, ABR will backup all of the components associated with this file. ABR will backup the associated VVR information for the cluster. The VVR information is contained within the SYS1.VVDS data set.
- . . . **Cyclic FDR/DSF backup.** User can specify that ABR is to backup changed data sets or ICF VSAM clusters only until a limit count is reached. At that time, ABR will interpose a full volume FDR dump. It is recommended that disk volumes be dumped incrementally once a day. Once a week (usually on the weekend), a full volume dump should be taken. This technique greatly reduces backup time while providing a periodic image copy of the entire volume.
- . . . **BACKUP MEDIUM.** ABR can backup disk files to tape (3400 and 3480) and to disk.
- . . . **Tracking the backups.** ABR will automatically keep track of all the backup files contained within the DASD MANAGEMENT SYSTEM (both full volume and data set) in the ABR catalog. This is a standard IBM catalog (either ICF VSAM or OS CVOL). ABR will also keep track of where individual data sets are backed up. If the OLDBACKUP option is enabled, ABR can keep track of the last fourteen backups of a data set. ABR uses reserved fields in the Format 1 DSCB to contain the backup information.
- . . . **COMPAKTOR Option.** ABR can execute COMPAKTOR to COMPAKT a volume after a full volume backup. The user can specify that the volume is to be COMPAKTeD only if it exceeds a user-specified degree of fragmentation.

NOTE: COMPAKTOR is a cost option to FDR, which must be licensed for this option to be available.

CONTINUED . . .



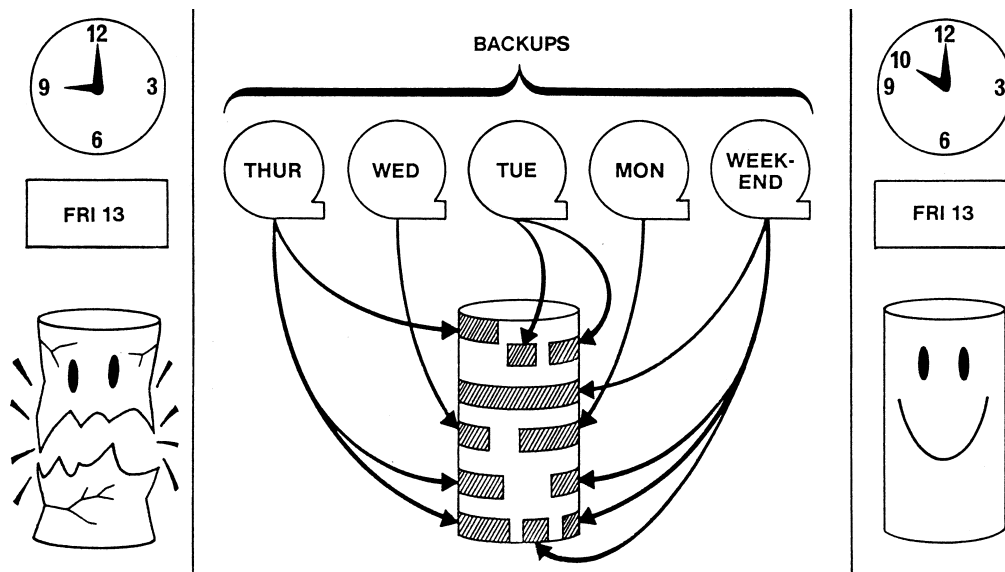
## 50.02 CONTINUED . . .

**RESTORING  
FROM  
INCREMENTAL  
BACKUPS**

- ... **Data Set Restore Function.** ABR will automatically call for the backup file containing the most current backup of the requested data set. If the data set does not exist on disk, ABR will pre-allocate and catalog the data set for the user. Restores can be specified by ABR backup cycle, making it possible to restore the data set processed by ABR on a prior backup.
- ... **OLDBACKUP Option.** ABR, optionally, keeps track of previous backups of a data set. The user can specify that ABR is to restore from (n) backups ago. The Backup Report Facility can be used to display all of the backups that ABR is currently tracking.
- ... **Backup Information.** ABR will retain the backup information for the data set being restored if it is being restored from the current generation. This includes current and old backup information.
- ... **ICF VSAM Restore.** ABR will restore ICF VSAM files using the cluster name. ABR will pre-allocate and catalog these files if they do not currently exist.
- ... **ICF VSAM Catalogs.** ABR can restore ICF catalogs to a new location or volume. This restore can recover the catalog without disturbing any of the data sets cataloged within it.

**FULL VOL-  
UME RE-  
STORE**

- ... **Automatic volume reconstruction.** If a disk volume is destroyed or accidentally re-initialized, ABR can reconstruct the volume to the state it was in the LAST TIME THE VOLUME WAS BACKED UP BY ABR. ABR will automatically call for the last incremental backup file, continuing backwards until the full volume backup is encountered. Each data set is restored from the last time it was dumped. If a data set was dumped multiple times, it will only be restored from its latest backup.



What if your disk volume is physically or logically destroyed?

ABR will reconstruct the volume starting with the incremental backup taken on Thursday, continuing backwards to the full volume backup taken on the weekend.

In a very short time, the volume is back online.

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## 50.02 CONTINUED . . .

**ARCHIVE and  
SUPERSCRATCH**

- . . . **Automatic archiving of data sets.** ABR, performing the ARCHIVE function, will backup, scratch, and uncatalog any data set or ICF VSAM cluster that has not been referenced for a user-determined time period or which was selected by control statement criteria. ABR will record these data sets in the ARCHIVE control file.
- . . . **ABR uses the Last Reference Date set by the MVS system.** The operating system will set today's date into the Format 1 DSCB each time a data set is opened.
- . . . **SUPERSCRATCH Facility.** ABR will allow the user to scratch data sets without first taking a backup. Most of the ARCHIVE selection criteria are available to SUPERSCRATCH.
- . . . **ICF VSAM.** ABR will ARCHIVE or SUPERSCRATCH ICF VSAM clusters based on the last reference date or control statement criteria. ABR will scratch and uncatalog these data sets.
- . . . **Data Set Validation.** The user has the ability to define data set naming standards for disk volumes. Data sets not meeting the specified standards will be archived to tape and scratched from the disk volume. On ICF VSAM files, both the cluster name and the component names will be validated.
- . . . **Multiple ARCHIVE Selection Criteria.** In addition to the Last Reference Date, the user can specify that ABR is to ARCHIVE data sets based on the size, creation date, DSORG, if expired, if not cataloged, if not password or RACF protected, and the number of generations of GDG-type data sets that are to be kept on disk.

**RESTOR-  
ING FROM  
ARCHIVE**

- . . . **ARCHIVE Restore.** ABR will automatically restore any requested data set which was ARCHIVED, using the ARCHIVE control file, dynamically allocating and cataloging the data set to an acceptable device type.
- . . . **ICF VSAM Restore.** ABR will restore ICF VSAM files using the cluster name. ABR will pre-allocate and catalog these files if they do not currently exist.
- . . . **AUTO RECALL.** ABR can automatically restore ARCHIVED data sets which are referenced by the user through a BATCH job or TSO session. Two exits are provided by ABR:
  - A CATALOG EXIT** is supplied to invoke an Auto Recall of the data set at job scheduler time or dynamic allocation of the data set (ex: TSO ALLOC, BROWSE, EDIT etc.). Under TSO, the user will be given the option of whether the data set should be restored and how it should be restored (foreground, background or remote queue).
  - A DATA SET NOT FOUND EXIT** is also supplied to invoke ABR when OPEN determines that a data set is not on the disk. If ABR is able to restore the data set, OPEN will continue normally.

CONTINUED . . .

## 50.02 CONTINUED . . .

**REPORTING  
FACILITY**

- . . . **Complete volume and data set reporting.** ABR will, on request, list all backup tapes created by ABR, list all data sets archived, list tape backup information on each data set that was dumped, etc. These reports can be printed by data set name or volume. ABR will format the report for either printers or CRTs.
- . . . **ARCHIVE data set reporting.** ABR will, on request, list all data sets that have been archived and the data set name and volume serial number of the tape(s) required to restore.
- . . . **Catalog reports.** ABR will, on request, list all backup files currently active within the ABR system.
- . . . **Volume mapping.** ABR will, on request, map all or selected disk volumes, either separately or combined, in data set sequence.
- . . . **BACKUP report.** ABR will, on request, map all or selected data set(s), displaying the most current backup and older backups for each of the data sets.
- . . . **Tape VTOC Report.** ABR will, on request, map all or selected data sets which were dumped to an FDR, DSF or ABR backup. The report can be in ABR or IEHLIST format. In addition, an IDCAMS style report can be generated for VSAM clusters.
- . . . **Scratch data set report.** ABR will, if the scratch or DADSM pre-processing exit has been implemented, print all data sets with current backups that have been scratched or renamed. ABR will report the last four backups (if available) for the data set.
- . . . **Wasted space reports.** ABR will, on request, print volume utilization reports. ABR will report on the percentage of free space on a volume and the amount of used space within partitioned and sequential data sets.
- . . . **Aging reports.** ABR will, on request, print aging statistics for data sets. This report indicates how many data sets have not been referenced in specified periods of time. The normal breakdown is data sets not referenced for under 30, 60 or 90 days. ABR will also report on the number of tracks that would be reclaimed if these data sets were archived.
- . . . **Data set utilization by ID.** ABR will, on request, report by USERID on the number of data sets by type (ex: PS, PO) and the number of tracks owned by these data sets. Also, the user can request aging statistics by ID. The ID can be the highest level index or some other index within the data set name.

**SIMULA-  
TION**

- . . . **Simulation reports.** Many ABR functions, including backup, ARCHIVE, SUPERSCRATCH, RESTORE, and various maintenance functions, can be performed in a simulation mode to obtain a report of what the function would actually do.

**GENERAL-  
IZED VTOC  
REPORT  
FACILITY**

ABR offers the user a generalized report program to display or print information about data sets, entire disk volumes or the entire installation.

**FDREPORT.** The program FDREPORT functions as a data extract or display processor for use with the VTOC or archive control file. The user can select and display information about a data set. Backup information, size and position of the data set, data characteristics, if cataloged or protected, etc., can be selected and positioned on the report using simple control statements. The user can select data sets by any qualifier or character within a data set name, or by almost any data set attribute.

**ICF VSAM Reporting.** The user can select information contained within the VSAM catalog and VVDS data set. The cluster name, CI and CA size, alternate index and path names, the catalog name, type of VSAM file (ex: KSDS, ESDS, imbedded index) and physical characteristics (ex: blocksize, average record size), etc., can be selected and positioned on the report. The user's report can be sorted using any of the supported fields in the VTOC or Catalog. For example, the user may request that ABR report on all of the data sets currently online in size order.

## 50.03 FDRABR SPECIAL FEATURES

**BACKUP  
MEDIUM**

**Improved tape utilization.** An unlimited number of disk volumes can be dumped or archived to tape with one execution of ABR. ABR will select the first disk volume specified to use the first tape drive. If additional tape drives have been provided, ABR will start a subtask for each additional tape drive. If more disk volumes have been specified than tape drives available, ABR will serialize the remaining volumes using whichever tape drive becomes available. The serialized dump is automatically appended as the next file on the tape. Since each tape is fully used, ABR uses fewer tape reels.

**Last Tape Option.** ABR will optionally ask for the last tape used by a previous ABR run. Using this option a user can make full utilization of all tapes in the ABR system. ABR will automatically call for the last tape used, forward space to the end of the last file used, validate that the last tape option file exists on the tape, and then ABR will start dumping to this new file.

**Automatic ABR tape cataloging.** ABR maintains its own catalog. The catalog may be either an ICF VSAM user catalog or an OS CVOL. ABR catalogs and uncatalogs backup files that it creates, based on user limits.

**Tape specification.** Normally, ABR requests SCRATCH Tapes for the backup procedure. However, in those installations in which tape management systems do not exist, the user may specify the specific tape volumes to be used.

**BACKUP to DISK as the Backup Medium.** A user can request that ABR is to use a pool of DISK drives as the backup medium for BACKUP or ARCHIVED data sets. At the same time a duplicate copy can be made to tape. A reason to use DISK for the backups is for ease of retrieval.

**TAPE MANAGEMENT Systems.** ABR is compatible with most tape management systems (e.g. CA-1 and CA-TLMS), including vaulting for offsite backup.

**DATA COMPRESSION.** ABR can be instructed to compress the data on the sequential backup or ARCHIVE file. This option will decrease the number of bytes transferred to the backup file. This is especially helpful when storing ARCHIVE files on disk for AUTO RECALL. The compressed file will usually be 20 to 50% smaller than an uncompressed file. However, the CPU time used by ABR to dump the disk will increase substantially.

**ABR  
ICF VSAM  
SUPPORT**

ABR will backup and restore ICF VSAM type files by cluster name, update indicator or last reference date. These files are supported by INCREMENTAL BACKUP, ARCHIVE and SUPERSCRATCH. ABR will backup all of the associated components for a cluster even if the update indicator is on only for the data component. ABR will pre-allocate and catalog ICF VSAM files for the user. ABR will report on ICF VSAM files by both the cluster name and component names. These files can be allocated to a different location on the volume or to a new name.

ABR will report on ICF VSAM files by both the cluster name and its associated component names.

Prior to DFP V3, MVS, as the default, will not set the last reference date or update indicator for ICF VSAM files. The ICF VSAM EXIT, which supports the setting of these indicators, must be enabled in the operating system ([See Installation Section 90 or 92](#)).

Non-ICF VSAM will be supported at the data space level.

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## 50.03 CONTINUED . . .

**DATA SET ENQUEUE** **Data Set Enqueue Option.** The user can request that ABR test the availability of the data sets on the volume(s) being dumped or restored. On full volume or incremental backups any data set which is active will have a warning message issued, but will still be dumped. On ARCHIVE, SUPERSCRATCH or DATA SET RESTORE, the data set will be bypassed. If COMPAKT is specified, these data sets will be marked as unmovable by COMPAKTOR. In addition, the user can request that the data set be enqueued during the execution of the DUMP and/or COMPAKTion.

**VOLUME INTEGRITY** **Volume integrity.** ABR will, on request, issue a RESERVE against the VTOC of any disk volume during the backup process to protect the volume from being accessed by other systems. VTOC enqueue support within the same system is provided automatically.

**TSO/ISPF PANELS** **ABR supplies the user with extensive TSO/ISPF Panels.** The Panels come with a full HELP tutorial. The Panels are user friendly, giving the user the full range of DASD management capabilities without requiring a detailed knowledge of ABR.

The REPORT Panel gives the user the capability to list data sets on disk and where they're backed up to, archived data sets, volume status and backup files, etc. The user can list specified data set(s) or all of the data sets by ID.

Using the BACKUP and ARCHIVE Panels, the user can request that ABR backup or archive data set(s).

The RESTORE Panel gives the user the capability to restore data set(s) which were archived or dumped. The user can specify that the data set(s) are to be restored in the foreground or background or via the remote queue.

The COMPAKTOR Panel can perform a MAP of a disk volume. In addition the user can request a SIMULATION of a COMPAKTION or RELEASE.

**REMOTE QUEUE** ABR has the ability to queue dump or restore requests from users (ex: TSO). The user can request that a data set(s) be dumped or archived the next time Operations executes a DUMP/ARCHIVE procedure against this volume(s). Also, a user can request that data set(s) be restored the next time Operations executes a restore procedure. Multiple users can concurrently access the remote queue, protected by ABR's internal reserves and enqueues.

**RELEASE/%FREE OPTION** The user can specify that ABR is to release all or a portion of the unused space in a data set after a data set restore operation.

**UNLIKE DEVICE SUPPORT** Migration between unlike volumes. ABR will allow the user to restore a PS, PO, DA, or ICF VSAM data set to an unlike device (ex: 3380 to 3390). The receiving volume may have a track larger or smaller than the original volume. However, PO data sets must not contain a block size larger than the receiving volume's track size and PS data sets must not contain records which are larger than the receiving volume's track size. This restore is done from the normal FDR/ABR backup tape. ABR will pre-allocate the data set for the user on the new volume. For PS and PO data sets, the user can request that these data sets be reblocked, and that all or a portion of the unused space be released.

**CACHE SUPPORT** ABR, if executed on a disk device which is connected to a caching control unit such as the 3990 model 3, will automatically avoid loading any new tracks into the cache for the data sets being dumped or restored. Tracks currently in the caching buffer belonging to other data sets will not be disturbed. Tracks in the cache that belong to the data sets being processed will be read from cache on a dump, and will be written to both cache and DASD on a restore.

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## 50.03 CONTINUED . . .

**DYNAMIC  
ALLOCATION**

ABR will dynamically allocate disk volumes on request. ABR has the ability to dump and restore to disk volumes that are ONLINE without DD statements. The user can specify that all volumes are to be processed, or can specify a list of volumes (MOUNT command). The ARCHIVE control file can be dynamically allocated.

On restore operations, the user does not have to know the type of backup medium used (TAPE or DISK). ABR will dynamically allocate the backup device. This function is supported by data set restores (both backup and archive) and full volume restores. Restores can have the backups mixed on 3400s, 3480s and disk.

**SCRATCH  
CATALOG**

If the ABR DADSM Pre-processing exit is installed ([See Section 92](#)), ABR will automatically keep track of scratched and renamed data sets which have current ABR backups but were not archived. The Scratch catalog will keep track of the last four backups for the data set. If the older SMP-installed ABR SCRATCH exit is used instead, only scratched data sets will be recorded.

To keep GDG-type data sets from filling up the scratch catalog, ABR will only track a limited number of generations for each GDG (by default, 4 generations).

**ABR  
PROTECT  
LISTS**

ABR supports the ability to protect data sets from specific ABR operations. Data sets can be excluded from BACKUP, ARCHIVE, SCRATCH or RESTORE operations. The user enables these options by using program FDRZAPOP ([Section 91](#)) or the ABR/ISPF install panels ([Section 92](#)).

**OLDBACKUP  
OPTION**

ABR has the option to keep track of a number of previous backups for a data set. The default is that ABR will only keep track of the most current backup of a data set. A user may optionally enable a volume for OLDBACKUP. Program FDRABRM ([Section 55 or Section 90](#)) or the ABR/ISPF install panels ([Section 92](#)) is used to enable this option for each volume.

If OLDBACKUP is enabled for a volume, ABR will use a reserved field within the DSCB to retain OLDBACKUP information. [Section 91](#) details two keywords OLDBENT and OLDBOFF which can be used to set which field ABR is to use within the VTOC. For each byte used in the DSCB, ABR will keep track of one previous backup. A maximum of 13 old backups can be kept track of.

To display the backups ABR is currently keeping track of, use the program FDRABRP with the command:

```
PRI NT      BACKUP, OLDBACKUP=ALL
```

If a data set containing OLDBACKUP information is scratched, ABR will retain the last four backups in the scratch catalog. To display all of the backups ABR is currently keeping track of for scratched data sets, use the program FDRABRP with the command:

```
PRI NT      SCRATCH, XREF, OLDBACKUP=ALL
```

On a RESTORE, the OLDBACKUP keyword requests a restore from a backup that is not the most current.

**UNUSED  
SPACE  
OPTIONS**

By default, ABR will dump the entire allocated space for every data set on a full volume backup, and on other types of backup and ARCHIVE will omit dumping the unused space within sequential and partitioned data sets. The user can override these defaults by using the DATA= and LBPZERO= operands.

**50.04 FDRABR DUMP JOB CONTROL REQUIREMENTS**

The following Job Control Statements are necessary to perform dump functions:

<b>JOB STATEMENT</b>	The JOB statement is user-specified and depends upon installation standards.
<b>EXEC STATEMENT</b>	Must specify the name of the program to be executed-FDRABR. The basic region size is 1200K for FDRABR. The storage requirement is increased by 1024K for each additional TAPEX DD statement specified on DUMP operations. If the COMPRESS option is used, add 1024K per TAPEX DD. The PARM, if specified, is used by ABR as the first control statement, e.g., PARM= 'DUMP TYPE=FDR'. If the PARM contains a slash ("/"), the data after the slash is used as the second control statement.
<b>STEPLIB or JOBLIB DD STATEMENT</b>	If required, must specify the load module library in which ABR resides. This library must be AUTHORIZED.
<b>SYSPRINT DD STATEMENT</b>	Specifies the output message data set. This is a required DD statement. SYSPRINT usually specifies a SYSOUT data set.
<b>SYSPRINx DD STATEMENT</b>	Specifies the secondary message data set for the DUMP operation. x must correspond to the x on each of the TAPEX DD Statements. One SYSPRINx must be specified for each TAPEX DD Statement. Required for all DUMP functions. Usually a SYSOUT data set. If not SYSOUT, this DD must specify a disposition of MOD.
<b>ABRMAP DD STATEMENT</b>	Specifies the output report data set if SIM or PRINT=ABR is specified. This DD is optional. If not specified the SIM report will be printed on the SYSPRINx DD Statement. Usually a SYSOUT data set. If not SYSOUT, this DD must specify a disposition of MOD.
<b>SYSUDUMP DD STATEMENT</b>	Specifies the ABEND dump data set. Although not required, we strongly urge you to always include this DD statement so we can help you diagnose your error conditions. Usually a SYSOUT data set.
<b>DISKxxxx DD STATEMENT(s)</b>	<p>Optionally specifies disk volumes to be processed by ABR. "xxxx" is 1 to 4 valid alphanumeric characters (0-9, A-Z); any combination may be used. ABR will build a list of the volume serials from all of the DISKxxxx DDs found in the ABR step JCL; the volumes will be processed in the order that the DISKxxxx DDs are found.</p> <p>If the ONLINE operand is specified, all online disk volumes will be processed automatically, so DISKxxxx DDs are not normally required. If the ONLVOL operand is specified, any volumes specified by SELECT statements (VOL= or VOLG= operands, or selected from the catalog by the CATDSN= operand) will be automatically processed. These volumes will be added to the list of volumes specified by DISKxxxx DDs (if any). However, both ONLINE and ONLVOL will select volumes in the order of their device addresses (UCB address order), so you may still want to use DISKxxxx DDs to specify the order of processing for certain volumes.</p> <p>Normally only one volume serial number is specified per DD statement, but up to 255 volume serials may be given (they must all be the same type and density, e.g., all 3380-K).</p> <p>A maximum of 256 disk volumes can be processed in one execution of ABR. If more disk volumes are required, MAXDD= must be specified.</p> <p>EXAMPLE:     //DI SK1         DD     UNI T=SYSDA, VOL=SER=vvvvvv, DI SP=OLD                      //DI SKABC     DD     UNI T=3390, DI SP=OLD,                      //               VOL=SER=( D3390A, D3390B, D3390C)</p> <p>NOTE: If ABR encounters multiple DISKxxxx DD statements pointing to the same disk volume serial, ABR will process the volume once using the first DDNAME encountered. DISKONLx is a reserved DDNAME, used by ABR for ONLINE processing. DISKxxxx must not specify UNIT=AFF or UNIT=(xxxx,,DEFER).</p>

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## 50.04 CONTINUED . . .

**TAPEx DD  
STATEMENT(s)**

Specifies the backup devices (tape or disk) to be used by ABR. x is any alphanumeric character (0-9, A-Z). A maximum of 10 such TAPEx DDs may be present in the ABR step JCL. ABR will start an internal dump subtask for each TAPEx DD present, each subtask processing one disk volume from ABR's list of disk volumes. If only one TAPEx is provided, ABR will process disk volumes one at a time; if multiple TAPEx DDs are present, ABR will process up to 10 disks in parallel (however, region requirements may limit the number of concurrent subtasks; see the EXEC statement on page 511). TAPEx DDs that specify DUMMY or DSN=NULLFILE will be ignored except for simulation.

SIMULATION: If SIM is specified, you must specify: //TAPE1 DD DUMMY

TAPE OUTPUT: If outputting to tape or cartridge, specify:

- DSN= — a dsname is required by MVS, but it will be overridden by ABR at OPEN time, so any non-temporary name is acceptable. However, MVS will do an exclusive ENQ on this name so each ABR job should use unique names.
- UNIT= — specify a generic (e.g., 3490) or esoteric (e.g., CART) name to allocate the type of tape drive desired. If you have sufficient tape drives available, specifying a unit count of 2 (e.g., UNIT=(3490,2)) may reduce elapsed time.
- DISP=(NEW,KEEP) — do not specify CATLG since ABR handles cataloging of output files internally.
- VOL — specify a volume count (e.g., VOL=(, , 255)) to prevent ABR from abending if more than 5 tape volumes are required. If no volume serials are specified, ABR will call for scratch tapes; this is recommended; however, you may specify up to 255 tape volume serials.
- LABEL= — you may want to specify RETPD=nnn or EXPTD=yyddd to specify the expiration date of the backups (retention periods may also be specified in the ABR model DSCB on each disk or on the DUMP statement). ABR does not make use of this expiration (except that the expiration dates of full-volume backups are recorded), but if you have a tape management system it will honor the expiration specified ([See Sections 52.06 and 52.12 for details](#)).

If multiple disk volumes are dumped to a given TAPEx DD, ABR will create multiple files on the tape (or tape aggregate if more than one tape volume is used), one file for each disk volume.

EXAMPLE: //TAPE1 DD DSN=ABR1, UNIT=3480, DISP=(NEW, KEEP),  
// VOL=(, , 255), LABEL=EXPDT=99000

**WARNING: If I/O errors occur on the output tapes, do not allow MVS to SWAP the tape to another unit (reply NO to any IFG500D messages).**

LAST TAPE OPTION: The LAST TAPE option of ABR allows you to add backup files to a tape or tape aggregate created by a previous ABR step (even if that step is in another job and even if it was run on a previous day). This option is controlled entirely through JCL. To request LAST TAPE, the TAPEx DD is similar to that described above except that you specify:

DSN=FDRABR.LASTAPE.xxxxxxxx — the last index is 1 to 8 characters of your choice; you may have multiple LASTAPE files for various purposes. This name will be cataloged to record the tape volume serial and file number where ABR is to start its output.

DISP=(MOD,KEEP) — this tells ABR to locate the FDRABR.LASTAPE.xxxxxxxx file in the catalog, verify that the file exists on the output tape, and begin outputting to the tape at that point. If the name is not cataloged, ABR will call for a scratch tape and begin at file 1. Also, if you specify NEW instead of MOD, ABR will ignore the LASTAPE file and use scratch tapes (but it will still record the LASTAPE for future use).

VOL= — volume serials should not be specified, but the volume count should be given.

EXAMPLE: //TAPE1 DD DSN=ABR.LASTAPE.ABR1,  
// UNIT=3480, DISP=(NEW, KEEP),  
// VOL=(, , 255), LABEL=EXPDT=99000

DISK OUTPUT: Backups are not normally output to disk files, but disk output is supported. [See Section 51.02](#) for details on specifying disk volumes for ABR output files. Since backups on disk cannot be restored by SAR (Stand-Alone Restore) and are of no use for disaster recovery, you may want to copy or move them to tape using the FDRTCOPY or FDRTSEL utilities documented in [Section 10](#).

WARNING: Tapes created by ABR cannot be copied using normal copy programs. Use the INNOVATION provided program, FDRTCOPY, to copy ABR tapes.

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## 50.04 CONTINUED . . .

**TAPExx DD STATEMENT(s)** Specifies that ABR is to create a duplicate backup. xx must specify the same character twice with xx corresponding to the x of the TAPEx statement.

EXAMPLE: //TAPE11 DD DSN=FDR11, DI SP=(, KEEP), UNI T=TAPE

will produce a tape which is the same as

//TAPE1 DD DSN=FDR1, DI SP=(, KEEP), UNI T=TAPE

NOTE: TAPExx may specify any of the options as documented for TAPEx.

ABR will read the disk once and write the same data to TAPEx and TAPExx concurrently. These are known to ABR as copy 1 (TAPEx) and copy 2 (TAPExx).

**SYSMAPx DD STATEMENT**

Specifies the output data set for the COMPAKTOR map. Must be present if COMPAKT is specified on a TYPE=FDR dump. x must match each TAPEx DD Statement.

**CPIN or CPINxxxx DD STATEMENT** Optional if COMPAKT is specified. This file specifies the CPK control statements to be used when COMPAKting the volume which matches the xxxx specified on the DISKxxxx DD Statement. If CPIN is specified without a qualifier xxxx, these control statements will apply to all DISKxxxx DD Statements which do not have a matching CPINxxxx. All of the CPK control statements are valid except for DUMP=YES, VTOC=COMPAKT, FROMDD= and ENQ=.

Default if CPINxxxx is not specified:

CPK DUMP=YES, ENQ=RESERVE, VTOC=NOCHANGE, FROMDD=TAPEx

NOTE: If ENQ is to be overridden or the data set enqueue option (DSNENQ=) is to be specified, they must be specified on the ABR DUMP statement.

If CPINxxxx is specified but it does not include a COMPAKT command, then the default is SIMULATE. A MAP statement may be specified if only a COMPAKTOR map is desired.

**CPKWORK DD STATEMENT** Required if an active INDEXED VTOC exists on the volume being COMPAKted. Usually specifies a temporary disk data set. One cylinder of primary with one cylinder of secondary should be specified. This data set must not be allocated on the volume being COMPAKted.

**IXSYSPT DD STATEMENT** Required on a non-MVS system with an active indexed VTOC. Under MVS, CPK will dynamically allocate this statement to DD DUMMY unless it is specified. Usually a SYSOUT data set. Used for ICKDSF BUILDIX messages.

**ABRKDQ DD STATEMENT** Specifies the remote queue data set for BACKUP operations. This DD statement is optional. If specified, ABR will read the control statements contained within, if any, and append these statements to the SYSIN data set. The SYSIN data set must contain at least a DUMP TYPE=ABR (DSF or AUTO) command. After reading the control statements, ABR will reset the file to null (empty) data set except on SIM.

NOTE: The TSO/ISPF Panels, or the AUTO-RECALL LOCATE exit or program FDRABRUT (Section 54) write to these remote queue data sets. DISP=SHR should be specified, since ABR internally reserves this data set.

CAUTION: This ABR execution must reference all of the volumes which contain the data sets specified in the remote queue. If the ABR PANEL was used to write to the remote queue, use the ONLVOL operand on the DUMP command.

**SYSIN DD STATEMENT** Specifies the control statement data set. Required for all ABR functions. Usually an input stream or DD \* data set.

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## 50.05 The ABR DUMP and SIM Commands

**DUMP**    *TYPE=FDR / ABR / DSF / AUTO*  
**D**        *,AUTOUPD=YES / NO*  
**SIM**     *,BUFNO=MAX / nn*  
            *,CATBYPERR*  
            *,COMPAKT*  
            *,CPKFREEX=nnn, | CPKDSNMX=nnn, | CPKMULTX=nnn*  
            *,COMPRESS=ALL / COPY1 / COPY2*  
            *,COPY1=COPY2*  
            *,DATA=ALL / USED*  
            *,DATEP=NONE*  
            *,DD=ALL*  
            *,DSNENQ=NONE / TEST / USE / HAVE*  
            *,ENQ=OFF / ON / RESERVE*  
            *,ENQERR=NO*  
            *,ENQERR=BYPASS / PROCESS*  
            *,FORMAT=OLD / NEW / SPLIT*  
            *,ICFCORE=nnnnnn*  
            *,LBPZERO=VALID / INVALID*  
            *,MAXAUTO=nnn*  
            *,MAXCARDS=nnnn*  
            *,MAXDD=nnnn*  
            *,MAXERR=nnnn*  
            *,MAXFILE=nnn*  
            *,NOINIT*  
            *,NOVSAM, | ICFSU60*  
            *,ONLINE, | ONLVOL*  
            *,PRINT=DSN / ABR*  
            *,RETPD=dddd*  
            *,SELTERR=NO / YES*  
            *,SMSCONSTRUCT=YES / NO*  
            *,SMSMANAGE=NO / YES*  
            *,TAPERRCD=NO*

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**DUMP COMMAND** The DUMP Command initiates the full-volume or incremental backup of disk packs or data sets. Only one DUMP statement is allowed per execution of ABR.

**SIM COMMAND** If SIM is specified, ABR will perform the DUMP function in a simulation mode. The TAPEX DD Statement must specify DD DUMMY. ABR will not perform the actual DUMP operation, but it will print the data set names selected by this operation using the PRINT VTOC format. Only one SIM statement is allowed per execution of ABR.

**ABR DUMP PROCEDURES** ABR offers the user two types of backups: an incremental backup of disk volumes or data sets and an ARCHIVE of data sets. The ARCHIVE Dump Command is detailed in the next section.

Incremental backup is the process of making a copy of disk data sets that have been changed since the last backup. At some interval (usually once a week) a full volume backup is taken. A GENERATION is the full volume backup and all of the incremental backups taken after it up to the next full volume backup. A CYCLE is the name given to one full-volume or incremental backup. The full volume backup is always cycle zero (00). ABR must start processing of any disk with a full volume backup.

On a busy pack, it is recommended that a full volume backup be taken once a week on the weekend. During the week, incremental backups can be taken (only those data sets that have been updated). A maximum of 63 incremental backups can be taken before a full volume backup is forced.

Manual backups of individual data sets (SELECT Commands) can be taken in conjunction with the automatic functions or individually (using TYPE=DSF).

**OPERANDS TYPE=** Specifies the type of dump to be performed.

**FDR** — Specifies that a full volume backup of all the volumes selected will be taken. This begins a new generation of backups for those disk volumes.

**ABR** — Specifies that an incremental backup of all the volumes selected will be taken. ABR examines the update flag set by the operating system. Any data set which has been updated since the last backup will be dumped, as well as any data set for which backup has been requested through the remote queue (program FDRABRUT). In addition, any data set specified by a SELECT command will be dumped. This function creates a new cycle within the current generation. The VTOC, indexed VTOC, VVDS, and any catalogs on the volume will always be dumped. Non-ICF VSAM data sets will be dumped unless NOVSAM is coded. If the ICFSU60 option is specified (or permanently set in the FDR/ABR Global option table) ICF VSAM clusters will be dumped only if their update flag is on, otherwise they will always be dumped.

(See Selection Rules for Data Set Backups in [Section 52](#) for a more detailed explanation).

**DSF** — Specifies that a manual backup of only the data sets specified by SELECT commands or the DD=ALL option will be taken. Note that if an ABR full-volume restore is performed ([See Section 50.10](#)) and the first incremental backup read was a TYPE=DSF backup, it will be bypassed and the data sets on the backup will not be restored from that backup.

**AUTO** — Specifies that ABR is to automatically determine whether a full volume or incremental backup is to be taken. ABR compares the number of incremental backups taken with AUTOUPD=YES ("auto cycles") in effect with the maximum number of cycles specified in the ABR model DSCB on the volume. When the number of auto cycles exceeds the maximum number of cycles, a FDR full volume dump is taken.

The default maximum cycles before a full volume backup is forced is 10 but can be changed by program FDRABRM or the ABR ISPF Dialogs.

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- AUTOUPD=** **NO** — specifies that ABR will not increment the auto cycle count for this execution. This is useful if this is a special run or a run outside of auto control. May be specified with TYPE=ABR, DSF or AUTO.
- YES** — specifies that this incremental backup will count for TYPE=AUTO operations.
- NOTE:** ABR maintains two cycle numbers. The CYCLE (last two digits of the backup name) is incremented on each backup run. The AUTO CYCLE is incremented if AUTOUPD=YES is specified or defaulted.
- Default is YES.
- BUFNO=** Specifies the ABR performance option.
- MAX** — specifies that ABR is to acquire enough buffers to retain a cylinder of data in storage at a time, and is to use an I/O technique involving the Read Multiple Count Key Data command or the Read Track command. This technique requires 1024K per concurrent backup without COMPRESS, or 2048K per concurrent backup with COMPRESS. The virtual storage for these buffers is located in the private area below 16 MB, and the real storage is located above 16 MB, if available. INNOVATION strongly recommends running with this technique for optimum performance.
- nn** — specifies the actual number of buffers to be acquired. This option may be requested if the installation does not have sufficient storage to support BUFNO=MAX. This option causes ABR to use a slower I/O technique than with BUFNO=MAX. nn should be an even number from 2 to the number of buffers needed to contain one cylinder (which is 16 for 3390, 3380, and 3350). If nn is an odd number, FDR will round down. If nn is higher than the number of buffers needed to contain one cylinder of the device being dumped, it will be treated the same as MAX. The storage requirement is about 58K per buffer for 3390 and about 50K per buffer for other devices.
- This option is ignored if backup is to disk.
- Default is MAX unless overridden in the FDR/ABR global option table ([See Section 91 or 92](#)).
- CATBYPERR** Specifies that, if the CATDSN= operand is used on SELECT statements, any error messages caused by trying to access catalogs which are OS CVOLS, or which have OPEN errors, will be suppressed; those catalogs will simply be bypassed.
- Default is that CVOL and OPEN errors will be reported.
- COMPAKT** TYPE=FDR and TYPE=AUTO only. Specifies that ABR is to execute FDRCPK internally to COMPAKT the volume after a successful full-volume DUMP (for TYPE=AUTO, will be ignored if a full-volume dump was not forced. A matching SYSMAPx DD statement must be present for each TAPEx DD. User may insert CPK control statements using a CPIN or CPINxxxx statement matching each DISKxxxx statement which they refer to. ([See Section 40 for the CPK control statements.](#))
- At the end of COMPAKTion, the update flag will be set for each data set that was moved by COMPAKTOR.

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**CPKFREEX=**  
**CPKDSNMX=**  
**CPKMULTX=**

Can only be specified with COMPAKT. These operands define an amount of fragmentation that the user considers acceptable. If none of these operands are specified, COMPAKTOR will be invoked unconditionally. If one or more of these operands are specified and none of the limits that they request are exceeded by a given volume, COMPAKTOR will not be invoked for that volume.

**CPKFREEX** — specifies the maximum number of free space areas that can exist before COMPAKTOR will be invoked.

**CPKDSNMX** — specifies the maximum number of data sets that can have more than one extent before COMPAKTOR will be invoked.

**CPKMULTX** — specifies the maximum number of extents that are not the first extent of a data set that can exist before COMPAKTOR will be invoked.

EXAMPLE: DUMP TYPE=FDR, COMPAKT, CPKFREEX=10, CPKDSNMX=5

If the volume does not exceed 10 free space areas or 5 multi-extent data sets, it will not be COMPAKTed. If it exceeds either limit, it will be COMPAKTed. The volume will still be dumped whether or not COMPAKTion is invoked.

**COMPRESS=**

**ALL** — specifies that ABR is to compress the output data on the backup file for both copies (TAPEX and TAPEXX).

**COPY1** — specifies that only the data on the TAPEX DD statement will be compressed.

**COPY2** — specifies that only the data on the TAPEXX DD statement will be compressed.

Add 1024K to the memory requirement for each TAPEX DD present when COMPRESS= is used.

Default is that the backup tapes will not be compressed.

INNOVATION strongly recommends running with COMPRESS to substantially reduce tape usage and to reduce elapsed time, if CPU time and storage are available.

**COPY1=COPY2**

Specifies that ABR is to create the backup tape using the data set name normally used by the second copy. A second copy is not created. This option is useful for users of vault systems who wish to create only one copy of a backup which can be identified with a different data set prefix from normal backups.

**DATA=**

**ALL** — specifies that ABR will dump the entire data set on an incremental backup.

**USED** — specifies that ABR is to dump only the used portion of PS or PO type data sets. On most packs, this will make the dump run faster, but at the risk of not backing up all of the data if data sets have invalid last block pointers.

If the data set has a last block pointer of zeroes, which usually means it was never used, ABR will default to dumping the entire data set unless LBPZERO=VALID is specified. With LBPZERO=VALID, ABR will dump only the first track.

ALL is the default, if a full volume backup was taken. Otherwise, the default is USED.

**DATEP=**

**NONE** — specifies that ABR will not check the expiration date of the last full volume dump taken.

Default is that ABR will force a full volume backup if the last full volume backup of the disk being processed has reached its expiration date.

**DD=ALL**

Specifies that ABR is to scan all the DISKxxxx DD Statements for the DSNNAME coded. ABR will attempt to backup these data sets. ABR will combine all of the data sets from one volume into one backup file. This feature is useful if data sets are allocated with non-specific volume requests.

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**DSNENQ=**

Specifies that ABR is to enqueue all of the data sets on the volume being dumped. ABR will issue an exclusive enqueue with a major name of 'SYSDSN' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, ABR will issue a warning message for the data set. The data set will still be dumped. If the COMPAKT option is used the data set will be treated as unmovable by COMPAKTOR. A condition code will be issued at the end of the ABR execution unless COMPAKTion is being done or ENQERR=NO is specified. DSNENQ is independent of ENQ= which prevents new data sets from being allocated or old data sets from being scratched.

**TEST** — The data sets will only be tested to see if they are active at the time the dump starts. The data set will not be enqueued.

**USE** — The data sets will be enqueued for the duration of the DUMP and COMPAKTion (if COMPAKT). If not available, only a warning message is issued and the data set will not be enqueued.

**HAVE** — The data sets will be enqueued for the duration of the DUMP and COMPAKTion (if COMPAKT). If not available, ABR will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. IF WAIT is specified, ABR will wait for the data set to become available. The job could time out. If NOWAIT is specified, ABR will print a warning message for the data set and will not issue the enqueue. If RETRY is specified, ABR will attempt the enqueue again.

**NONE** — This is the default. No data set ENQ will be issued.

**NOTE:** If the data set is specified in a DD statement in the ABR job with a DISP=SHR, ABR will change the scheduler enqueue for the data set to EXCLUSIVE (DISP=OLD) if the user specifies TEST, USE or HAVE. The operator cannot respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.

**CAUTION:** This option should not be used on shared DASD unless a cross-system enqueue facility is available and the SYSDSN QNAME is broadcast across systems. Without this capability, ABR can only determine what data sets are active on the system ABR is running on.

**ENQ=**

**ON** — specifies that ABR is to perform an enqueue on the VTOC during the dump operation. This enqueue will prevent other tasks from allocating new data sets or scratching old data sets on the system ABR is running on.

**RESERVE** — specifies that ABR will issue a RESERVE on the volume being dumped. This command will lock out a shared DASD system from accessing the pack.

**OFF** — specifies that ABR will not enqueue the VTOC during the dump. Default is ON, unless COMPAKT was specified, then the default will be RESERVE.

**ENQERR=**

**NO** — specifies that ABR will not set a condition code or abend at the end of the ABR execution if the DSNENQ option is used and a data set is found to be active.

Default is that ABR will issue the condition code or abend unless COMPAKT is specified.

**ENQERR=**

**BYPASS** — specifies that ABR not dump a data set if the DSNENQ= option is used and the data set is found to be active.

**PROCESS** — specifies that ABR is to dump a data set even if the DSNENQ= option found it to be active (a warning message will still be produced).

Default is PROCESS.

**NOTE:** both ENQERR=NO and ENQERR=BYPASS/PROCESS may be specified on the same DUMP statement.

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<b>FORMAT=</b>	<p>Specifies the format of the sequential backup file.</p> <p><b>OLD</b> — specifies that ABR is to create the backup using the format prior to Ver 4.5. This option defaults to SPLIT on 3380 and 3390 disk.</p> <p><b>NEW</b> — specifies that ABR is to create the backup using a maximum of a 56K blocksize.</p> <p><b>SPLIT</b> — specifies that ABR is to create the backup using a maximum blocksize of 32K. ABR will split the backup blocks into multiple records.</p> <p>WARNING: If you use normal copy programs (ex: IEBGENER) you will not get any error messages, but the resulting tape will not be usable for a restore. Tapes in the new format must only be copied with the INNOVATION provided tape copy program (FDRTCOPY) or FATAR (Version 4 or higher). If FORMAT=OLD or SPLIT is specified, ABR will ignore the BUFNO option.</p> <p>Default: NEW if backup on tape — SPLIT if backup is on disk.</p> <p>Use of FORMAT=OLD or SPLIT will result in a large increase in elapsed time.</p>
<b>ICFCORE=</b>	<p>Specifies that ABR is to increase the size of the table used to store the ICF VSAM cluster and component names. ABR needs to save all of the component names and their associated clusters which currently exist on the volume. nnnnnn is specified in bytes and must be large enough to contain all the VSAM names.</p> <p>NOTE: Specifying ICFCORE= will increase the ABR memory requirement by the value specified. The default value imposes no additional memory requirement.</p> <p>Default is 49152 bytes, which normally holds about 600 ICF VSAM components. If the input disk is a 3390, the default is 53248, which will hold about 650 components.</p>
<b>LBPZERO=</b>	<p><b>VALID</b> — specifies that ABR is to consider PS data sets which are empty (last block pointer of zero) as containing one used track.</p> <p><b>INVALID</b> — specifies that ABR will consider PS data sets which are empty as fully used.</p> <p>WARNING: Care should be taken using this option since certain data sets may have the last block pointer as all zeroes and not be empty. EX: SYS1.DUMP data sets.</p> <p>Default is INVALID unless overridden in the FDR/ABR global option table (<a href="#">See Section 91 or 92</a>).</p>
<b>MAXAUTO=</b>	<p>TYPE=AUTO only. Specifies the maximum number of full volume dumps that can be forced by TYPE=AUTO within this execution. Incremental backups will continue to be taken for any additional volumes unless forced by the expiration date or maximum cycle number.</p> <p>Default is that TYPE=FDR will be forced for all volumes exceeding the auto count.</p>
<b>MAXCARDS=</b>	<p>Enables ABR to accept additional SELECT, EXCLUDE and MOUNT commands during this execution.</p> <p>Default is 100 SELECT, EXCLUDE and MOUNT Commands.</p>
<b>MAXDD=</b>	<p>Specifies the maximum number of DISK volume serials that ABR will accept from DISKxxxx DD statements or ONLINE volumes if ONLINE, ONLVOL or MOUNT is coded. Once this limit is reached additional volumes will be ignored.</p> <p>Default is 256 volumes, unless overridden by the MAXONLINE option in the FDR/ABR global options table (<a href="#">See Section 91 or 92</a>).</p>

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<b>MAXERR=</b>	<p>Specifies the number of tape or disk errors that are to be encountered by ABR prior to abending the DUMP operation. MAXERR may specify a value from 1 to 9999 errors. Each error will be indicated by a message and possible MINI DUMP.</p> <p>WARNING: MAXERR over the default value may result in the loss of many data sets. This option should only be used when necessary and with care.</p> <p>Default is 20 errors.</p>
<b>MAXFILE=</b>	<p>Specifies the maximum number of files ABR will use on tape. May specify from 1 to 255. When the maximum file number is exceeded, ABR will start a new tape using file sequence number 1.</p> <p>Default is 255.</p>
<b>NOINIT</b>	<p>SIM only. Specifies that ABR is to perform the simulation on the volumes specified even if they are not initialized for ABR processing. The ABR error messages will still be issued.</p>
<b>NOVSAM ICFSU60</b>	<p>TYPE=ABR or AUTO only. ABR will normally back up all VSAM files on a disk volume during incremental backups.</p> <p><b>NOVSAM</b> will let ABR ignore ALL VSAM data sets unless they are selected by SELECT commands or update (See ICFSU60).</p> <p><b>ICFSU60</b> instructs ABR not to automatically select ICF VSAM files. All non-ICF VSAM will still be backed up. ABR will select ICF files if the update indicator is set or if referenced by a SELECT command. User must have update support enabled in the operating system for ICF VSAM. (<a href="#">See Section 90</a>).</p> <p>INNOVATION recommends that installations with ICF VSAM should install the modification for ICF VSAM to record the update indicator and last reference date (<a href="#">Section 90.12A</a>), and then enable the ICFSU60 global option (ISPF panel A.I.4.4, or <a href="#">Section 91</a>), and not specify NOVSAM or ICFSU60 on the DUMP command. If DFP V3 or above is installed, the modification is not required and ICFSU60 will be assumed even if not set in the option table.</p>
<b>ONLINE ONLVOL</b>	<p>ABR normally will only process volumes specified by DISKxxxx DD statements.</p> <p><b>ONLINE</b> — specifies that ABR is to scan every volume that is ONLINE to the system). These volumes will be appended to the normal DISKxxxx volume list, if any.</p> <p><b>ONLVOL</b> — specifies that ABR is to scan the SELECT statements for the operands VOL=, VOLG=, or CATDSN= (for volume selected from the catalog). These volumes, if online, will be appended to the normal DISKxxxx volume list.</p> <p>If ABR finds that the user specified EXCLUDE statements with ALLDSN and VOL or VOLG, these volumes will not be included in the ONLINE list unless a DISKxxxx DD statement is present for this volume.</p> <p>An additional way for the user to specify which volumes are to be processed is the use of the MOUNT command. The MOUNT control statements can be specified after the DUMP statement, and after any SELECT/EXCLUDE statements. The MOUNT command should specify VOL=, VOLG=, or STORGRP=; the ONLVOL option is not required if all volumes to be processed are specified by MOUNT or DISKxxxx statements. These control statements are only used to build a volume list and do not cause particular data sets to be selected.</p> <p>EXAMPLE:     MOUNT   VOLG=SYS</p> <p>specifies that all online volumes beginning with 'SYS' will be added to the volume list.</p>

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- PRINT=** **DSN** — Specifies that ABR is to print the data set names that were dumped during a full volume backup.
- ABR** — Specifies that ABR is to use the PRINT VTOC format for each data set that was dumped.
- Default is that the data set names selected will be displayed for all dump operation except for full volume dumps.
- RETPD=** Specifies the number of days the backup files will be kept. “dddd” is any value 1 thru 9999. A backup tape must be kept at least one day. This value overrides all other retention values. If not specified, the tape JCL is scanned for LABEL=EXPDT or LABEL=RETPD dates. If not specified on the JCL, ABR will use the defaults established in the model DSCB for a full volume dump (TYPE=FDR). An incremental backup will expire on the same day as the current FDR generation, unless overridden.
- (See Retention Period in [Section 52](#) for a more detailed explanation).
- SELTERR=** **NO** — specifies that ABR is not to set a condition code of 12 if a SELECT statement is not referenced.
- ABR** — specifies that ABR will set a condition code if a SELECT statement is never referenced.
- Default is YES unless overridden in the FDR/ABR Global Option Table ([See Section 91 or 92](#)).
- SMSCONSTRUCT=** **YES** — specifies that ABR is not to process SMS-managed volumes unless their associated storage group has the attribute AUTO-DUMP=YES and AUTO-BACKUP=YES. (Volumes with AUTO-DUMP=YES but AUTO-BACKUP=NO will be selected for TYPE=FDR runs only, and bypassed on others). The SMS volumes must still have a proper ABR model.
- NO** — specifies that ABR will bypass selected volumes based only on the presence or absence of the ABR model, ignoring the SMS storage class attribute.
- Default is YES.
- SMSMANAGE=** **NO** — specifies that ABR is not to exclude data sets from SMS-managed volumes based on the attributes of their SMS management class.
- YES** — specifies that data sets on SMS-managed volumes are to be excluded from data set backups if their associated SMS management class indicates “ADMIN OR USER COMMAND BACKUP” is “NONE” (for all data set backups) or “AUTO-BACKUP” is “NO” (for TYPE=ABR/AUTO). If not excluded by the above, data sets will be selected by normal ABR rules ([See Section 52.02](#)) or by SELECT statements. [See Section 52.50](#) for more details.
- Default is NO.
- TAPERRCD=** **NO** — specifies that ABR is not to set a condition code or abend if a data check or error occurred writing the backup file but ABR recovered from it.
- Default is that ABR will set the condition code or abend at the end of the job.

## 50.06 SELECT, EXCLUDE AND MOUNT COMMAND FORMAT FOR BACKUPS

**SELECT**    *DSN=filter* | *CATDSN=dsname* | *DD=ddname* | *ALLDSN*  
**S**            *,CATALOG=catname* | *,MCATALOG=catname*

**EXCLUDE**    *,CATBYPERR* | *,CATLIMITGDG=n*  
**X**            *,DATA=ALL*  
               *,DSNENQ=NONE*  
               *,DSORG=(xx,xx..)*  
               *,PRTALIAS*  
               *,UPDATE*  
               *,VOL=vvvvvvv* | *,VOLG=vvvvvv*

**MOUNT**    *VOL=vvvvvvv* | *VOLG=vvvvvv* | *STORGRP=storagegroup*

**SELECT COMMAND**    The **SELECT** command specifies data sets to be dumped. SELECT commands cannot be specified on DUMP TYPE=FDR operations. The SELECT command instructs ABR to scan the volumes being processed for these data sets. If found, ABR will dump them.

**EXCLUDE COMMAND**    **EXCLUDE** — specifies that ABR is not to process these data sets. VOL= or VOLG= can be specified to limit it to certain volumes. If EXCLUDE ALLDSN,VOL(G)=vvvvvv is specified, ABR will bypass the processing of the volumes specified, if there was no DISKxxxx DD statement present for the volume, and the volume was not selected by the ONLINE operand. On DUMP TYPE=FDR operations, EXCLUDE commands that do not specify ALLDSN must not be specified.

**NOTE: These commands are scanned in the sequence they appear in the control statement file. EXCLUDE commands must be specified before any SELECT commands which reference the same data sets.**

**MOUNT COMMAND**    The MOUNT command is used to specify additional volumes to be processed by ABR. VOL=, VOLG=, or STORGRP= must be specified. STORGRP= can be used only on systems with SMS active; it will select all volumes in the specified SMS storage group.

**DUMPING ICF VSAM FILES**    ICF VSAM clusters are selected using the base cluster name for DSN= or CATDSN=. ABR will dump all of the components associated with this cluster which exist on the volumes dumped. This includes alternate indexes and key range components. The component names will be reported by ABR followed by the cluster name. ABR will dump to the backup tape all of the associated VVR records found in the 'SYS1.VVDS' data set. For further information, [See Section 52.11](#), VSAM SPECIAL CONSIDERATIONS.

## 50.06 CONTINUED . . .

<b>OPERANDS</b>	<b>DSN=</b>	<p>Specifies a fully-qualified data set name or a filter to be used for generic data set selection, as described in <a href="#">Section 52.16</a>. This name or filter will be used when scanning the VTOCs of selected volumes.</p> <p>EXAMPLES: DSN=USER1. JCL. CNTL</p> <p>DSN=**LI ST</p> <p>DSN=PROD++. **. LI B*</p> <p>NOTE: The DSG= operand documented in previous versions of FDR/ABR is still accepted, but the DSN= operand with a generic data set name filter is the preferred way of selecting groups of data sets.</p>
	<b>CATDSN=</b>	<p>Specifies a fully-qualified data set name or a filter to be used for generic data set selection from system catalogs, as described in <a href="#">Section 52.16</a>.</p> <p>If a fully-qualified name is specified, that name will be located in the system catalogs, and the volume serial(s) from the catalog become an implied VOL= parameter (if ONLVOL is specified, the volume will be added to the ABR volume list). Specification of a relative generation number for GDG data sets is supported (e.g., CATDSN=A.B(—1)).</p> <p>If a filter is specified, then catalogs will be scanned for all cataloged data sets matching the filter, and they will be processed as if a SELECT CATDSN=dsname was present for each of them. It may be necessary to specify MAXCARDS=nnnnn if a large number of data sets are selected by the filter. Additional considerations for CATDSN=filter are explained in <a href="#">Section 52.16</a>.</p> <p>CATDSN= is supported only on SELECT statements. If the VOL/VOLG= operand is also specified on a SELECT statement with CATDSN=, then only data sets cataloged to those volumes will be selected.</p> <p>EXAMPLES: CATDSN=USER1. JCL. CNTL</p> <p>CATDSN=**MASTER(O)</p> <p>CATDSN=PROD++. **. LI B*</p> <p>Normally CATDSN= will not display the data sets it selects from the catalogs, you will see the names only when ABR actually finds and selects the data sets in the VTOCs of the volumes they are cataloged to. To display all of the data sets selected specify PCATDSN=filter.</p> <p>WARNING: depending on the filter specified, CATDSN= may need to search many catalogs.</p>
	<b>DD=</b>	<p>Specifies that a data set name is to be taken from a DD statement. This operand must point to the DDNAME of a JCL statement. It does not imply that the volume on which the data set exists is automatically processed unless the DD name is DISKxxxx.</p>
	<b>ALLDSN</b>	<p>Specifies that ABR is to backup all data sets on the volumes specified. If TYPE=DSF is specified, SELECT ALLDSN will not dump the VTOC and label track as well; use DSN=VTOC on the DUMP statement to include them.</p> <p>EXCLUDE ALLDSN with the VOL= or VOLG= operand will totally exclude those volumes from ABR processing.</p> <p>NOTE: DSN=, CATDSN=, DD= and ALLDSN are mutually exclusive. One and only one DSN=, CATDSN=, DD= or ALLDSN operand must be specified on a SELECT or EXCLUDE Command.</p>
	<b>CATALOG=</b> <b>MCATALOG=</b>	<p>Specifies the name of a user catalog (CATALOG=) or alternate master catalog (MCATALOG=) to search when CATDSN= is specified. <a href="#">See Section 52.16</a> for details.</p>
	<b>CATBYPERR</b>	<p>Default is that the catalog search will start with the active master catalog. User catalogs will be searched if their assigned aliases match the CATDSN=filter.</p> <p>Specifies that, if the CATDSN= operand is used on SELECT statements, any errors messages caused by trying to access catalogs which are OS CVOLS, or which have OPEN errors, will be suppressed; those catalogs will simply be bypassed.</p> <p>Default is that CVOL and OPEN errors will be reported unless CATBYPERR was specified on the DUMP statement.</p>

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## 50.06 CONTINUED . . .

- CATLIMITGDG=** May be used with CATDSN=filter to limit the selection of GDGs from the catalogs. It will not affect the selection of cataloged non-GDG data sets, but if the filter selects a GDG then:  
**n** will cause only the most recently created “n” generations to be selected.  
**—n** will cause only generation (— n) to be selected.  
 Default is that all the generations of selected GDGs will be selected (unless a relative generation number is specified at the end of the filter, e.g., CATDSN=filter(— 2)).
- DATA=** **ALL** — specifies that ABR will dump the entire data set. Normally, ABR on incremental backups, will only dump up to the last block pointer (end-of-file) on PS or PO data sets. Should be used if the last block pointer is invalid.
- DSORG=** Specifies that these data sets is not to be selected unless DSORG matches one of the DSORGS specified. If more than one DSORG is specified, they must be enclosed in parenthesis.  
 VALID DSORGS are:  
 DA – BDAM    PS – SEQUENTIAL    AM – ALL VSAM    EF – ICF VSAM  
 IS – ISAM    PO – PARTITIONED    UN – UNDEFINED    UM – UNMOVABLE
- DSNENQ=** **NONE** — specifies that ABR is not to perform an enqueue of these data sets.  
 Default is that no enqueue is done unless DSNENQ=TEST, USE or HAVE is specified on the DUMP command.
- PRTALIAS** When used on a SELECT statement with CATDSN= it will display all of the alias names and user catalogs which were searched.
- STORGRP=** Can only be used on the MOUNT command, and only on systems with SMS (System Managed Storage) active. Will select all online volumes in the specified SMS storage group.  
 EX:        MOUNT        STORGRP=DBLARGE  
 will cause ABR to process all volumes in that storage group.
- UPDATE** Specifies that the data sets or ICF VSAM clusters that match this control statement will only be dumped if the update indicator is set.  
 NOTE: If a user wishes to do incremental backups of only the specified data sets (using the update indicator) specify TYPE=DSF.  
 EX:        DUMP        TYPE=DSF, COMPRESS=ALL  
              SELECT        DSN=USER\*\* , UPDATE  
              SELECT        DSN=XYZ\*\* , VOLG=vvvvvv, UPDATE
- VOL=** Specifies a volume serial number to which this the SELECT or EXCLUDE Command applies. If not specified, ABR will scan all of the DISKxxxx volumes or ONLINE volumes (if ONLINE was specified) for the data sets.
- VOLG=** Specifies a group of volume serials from which this data set is to be selected. Any disk volume serial starting with the 1 to 5 characters specified will be searched for the data set.  
 NOTE: VOL=, VOLG= and STORGRP= are mutually exclusive. For MOUNT commands, one of those operands must be specified. If ONLVOL is specified, the volumes will be appended to the volume list.

**50.07 FDRABR RESTORE JOB CONTROL REQUIREMENTS**

The following Job Control Statements are necessary to perform RESTORE functions:

**JOB  
STATEMENT**

The JOB statement is user-specified and depends upon installation standards.

**EXEC  
STATEMENT**

Must specify the name of the program to be executed-FDRABR. The basic region size is 512K. However, some restore options, especially logical restore, may increase the region requirement. If a PARM= is specified, it will be used as the first ABR control statement (e.g., PARM='RESTORE TYPE=ABR'). If the PARM contains a slash ("/") the data after the slash is used as the second control statement.

**STEPLIB or  
JOBLIB DD  
STATEMENT**

If your installation requires either of these statements, they must be the library that contains the ABR modules. It must be AUTHORIZED.

**SYSPRINT DD  
STATEMENT**

Specifies the output message data set. This is a required DD statement for all ABR functions and is usually a SYSOUT data set.

**SYSUDUMP DD  
STATEMENT**

Specifies the ABEND dump data set. Although not required, we strongly urge you to always include this DD statement so we can help you diagnose your error conditions. Usually a SYSOUT data set.

**TAPEx DD  
STATEMENT**

Specifies the input tape drive to be used for the RESTORE operation. "x" is any valid alphanumeric character (0-9, A-Z). This tape drive must be capable of reading the density of all the tapes needed for this restore. The Data Set Name (DSN) and Volume Serial Number (VOL) specify dummy values, with ABR supplying the proper fields internally. The UNIT parameter must specify DEFER. The DISP parameter should be (OLD,KEEP). Only the first TAPEx DD provided is used by ABR during a RESTORE operation unless TAPEDD is specified on a SELECT Command.

EXAMPLE:           //TAPE1       DD       DSN=FDR, VOL=SER=FDR,  
                      //           UNI T=( TAPE, , DEFER) , DI SP=(OLD, KEEP)

NOTE: If the user specifies TAPEDD=x, the "x" must match a TAPEx DD statement. This statement must specify the data set name, unit, VOLSER, file sequence and disposition of the Backup DATA SET.

DYNTAPE NOTE: If DYNTAPE is specified, this DD statement is not used and can be omitted. ABR will dynamically allocate a TAPE# DD statement for the backup device.

DYNTAPE should be used if the backup is on disk or if a mixture of 3400 and 3480 backups are to be restored. Do not use DYNTAPE and TAPEDD= in the same execution.

SIMULATION: If SIMREST is coded, this DD usually specifies DUMMY.

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## 50.07 CONTINUED . . .

- DISKxxxx DD STATEMENT** For ABR full-volume restore (RESTORE TYPE=FDR) a DISKxxxx DD must be provided for each disk being restored.
- EXAMPLE:    //DI SK1234   DD    UNI T=SYSDA, VOL=SER=DSK123, DI SP=OLD
- For data set restores, DISKxxxx DDs are not used; ABR will dynamically allocate any required output volumes. Even if DISKxxxx DDs are present, they will not influence ABR's choice of output volumes ([See Section 50.08](#)).
- ABRREST DD STATEMENT** Specifies the remote queue data set for restores from the backup subsystem. This data set is optional. If specified, ABR will read the control statements contained within, if any, and append these statements to the SYSIN data set. The SYSIN data set must contain at least a RESTORE TYPE=ABR command. If the operation is not a data set restore from the backup system, this file will be ignored. After reading the control statements, ABR will reset the file to null (empty) data set except on SIMREST.
- NOTE: The TSO/ISPF panels or program FDRABRUT write to these remote queue data sets (Section 54 in the machine-readable copy of the manual only). DISP=SHR should be specified for ABRREST, since ABR internally controls access to this data set.
- SYSIN DD STATEMENT** Specifies the control statement data set. Required for all ABR functions. Usually an input stream or DD \* data set.

**50.08 The ABR DATA SET RESTORE Command**

**RESTORE**    *TYPE=ABR*  
**R**            *,BLKF=nn*  
  
**SIMRES**    *,BYPASSACS*  
**T**            *,BYPASSSMS*  
              *,CATBYPERR*  
              *,CATIFALLOC*  
              *,COPY=n*  
              *,DATA=ALL*  
              *,DD=ALL*  
              *,DSNENQ=NONE | TEST | USE | HAVE*  
              *,DYNTAPE, | DYNTAPE2,*  
              *ICFCAT=ORIGINAL | STEPCAT | ALIAS*  
              *,MAXCARDS=nn*  
              *,NOCAT | ,RECAT*  
              *,OPERATOR*  
              *,PRESTAGE*  
              *,RLSE | ,%FREE=nn*  
              *,SELTERR=NO | YES*  
              *,MSGDG=DEFERRED | ACTIVE | ROLLEDOFF | INPUT*  
              *,VRECAT*

NOTE: The ONLINE and ONLVOL operands, and the MOUNT statement are no longer required for RESTORE in V5.1; output volumes will be dynamically allocated as required. They will be accepted but will have no effect.

**RESTORE COMMAND**    The RESTORE TYPE=ABR command activates a restore of individual data sets from the backup subsystem. Only one RESTORE statement is allowed per execution of ABR, but any number of data sets can be restored in one ABR step.

**SIMULATED RESTORE**    If SIMREST is coded, ABR will print the data sets which will be selected and the volumes necessary to do the restore. A restore operation is not done. It can be used to test RESTORE options or to pre-pull the tapes required.

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## 50.08 CONTINUED . . .

**ABR RESTORE  
PROCEDURE**

This restore procedure restores data sets which were backed up by the ABR backup subsystem (See [Section 50.05](#)). Usually these data sets will still exist on their original disk, so ABR will restore them in place. If they do not exist or if a restore to a new name which does not exist is requested, ABR will allocate them. Full volume and ARCHIVE restores are detailed in their own sections.

[Section 52.04](#) details how ABR RESTORE selects the appropriate ABR backup file on disk or tape for each data set to be restored. If multiple data sets are to be restored from a given backup, that file will be read only once. While reading a backup file, ABR can restore the selected data sets to one or more disk volumes concurrently. The target disk volume will be selected for each data set by the following rules:

- \* If the NVOL= operand was specified on the SELECT statement which selected this data set, that volume or volumes will be used. If NVOL= specified more than one volume serial, the first of those volumes will be selected; allocation may be attempted on up to 64 of those volumes in turn until it is successful. If the NVOL list includes more than one type of disk device, those with the same type as the input data set ("like" devices) will be tried first. Any volumes in the NVOL list which are not online will be ignored.
- \* If the output data set name (the original name, or the newname if the NEWNAME=, NEWGROUP=, or NEWINDEX= operand was specified on the SELECT statement which selected the data set) is cataloged, then the volume to which it is cataloged will be chosen. If the data set is cataloged as being on multiple volume serials, then the volser will be selected from that list based on the volume sequence number in the F1 DSCB (field DS1VOLSQ) of the input data set.
- \* If none of the above apply, then the serial of the volume from which the data set was dumped, as recorded by ABR, will be used.
- \* If the data set was not preallocated on the selected volume, and the allocation fails on that volume for any reason, the ABR RESTORE ALLOCATION LIST, if enabled ([See Section 91.05](#)), will be checked to see if there is an ALLOCATE statement which applies to this data set. If so, the NVOL list from that statement will be used as described above for NVOL=.

If SMS (System Managed Storage) is active on this system, and the data set does not already exist on the volume selected by the rules above, SMS is invoked to decide if the data set should be SMS-managed. If so, SMS will select an output volume. SMS rules are detailed in [Sections 20.01](#) and [52.50](#).

**RESTORE ICF  
VSAM FILES**

ABR will restore ICF VSAM files using the base cluster name. ABR will restore each individual component associated with this cluster name. ABR will allocate ICF VSAM files if they do not currently exist. ABR will update the appropriate fields within the VVR for this data set. ICF VSAM files except the VVDS itself are movable. ICF VSAM files except for the VVDS and catalogs can be restored to a new name or group. If NEWGROUP= or NEWINDEX= are specified the new group name will be applied to both the cluster name and all of its components. If NEWNAME= is specified for a cluster which is not allocated, ABR will let VSAM determine names for the components. Information contained solely in the catalog, including protection (RACF or PASSWORD), expiration date, and path names for alternate indexes, will not be updated. [See Section 52.11](#), VSAM SPECIAL CONSIDERATIONS, for a more detailed explanation.

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**ALTERNATE  
DEVICE  
SUPPORT**

ABR can restore data sets to a new device type.

A restore to different models of the same device type is a “like” device (physical) restore, treated the same as a restore to the original device and model, as long as the output volume has sufficient space to hold the data sets being restored. For example, a data set backed up from any 3380 can be restored to any 3380 single, double (3380-E) or triple (3380-K) density disk, or any 3390 in 3380 compatibility mode; any 3390 native mode data set can be restored to a single (3390-1), double (3390-2) or triple (3390-3) density disk.

ABR can also restore data sets that were backed up from one device type to a totally different type of disk (an “unlike” device) using a logical restore. For example, data sets can be restored from a backup of a 3380 (any model) to a 3390 (any model). Data sets can be restored from one backup file to both like and unlike devices concurrently. The logical restore occurs automatically when ABR detects the different device type or when reblocking is requested. The logical restore is from the normal ABR physical backup tape; no special logical dump is required.

Logical restore supports most data set organizations (DSORGs) including ICF VSAM. When allocating data sets on an unlike device, ABR will allocate an amount of space roughly equivalent to the size of the input data set in bytes. Pre-allocated data sets must be allocated with this same space (VSAM clusters cannot be preallocated when restoring to an unlike device).

Details on how physical and logical restore handle each type of data set are in [Section 52.15](#). More detail on restore to different device types is in [Section 52.14](#).

**OPERANDS TYPE=ABR**

Specifies a request to restore data sets from the ABR backup subsystem (regardless of whether the dump was done with TYPE=FDR, TYPE=ABR, TYPE=DSF, or TYPE=AUTO). ABR will attempt to restore all the data sets specified by the SELECT Commands, DD=ALL option or remote queue data set. If the original data set does not exist on the volume and the data set is not recorded in the ABR Scratch Catalog, a manual restore (GEN= and CYCLE=, or TAPEDD=) must be specified. If the data set was ARCHIVED by ABR, a TYPE=ARC restore should be used. A TYPE=ABR restore using the TAPEDD option can also be used to restore backups created by the ARCHIVE operation.

**BLKF=**

Specifies that ABR is to reblock PS fixed and variable record format and PO data sets. Except when restoring a PS file to a smaller disk the blocking factor must result in a larger blocksize, otherwise it will be ignored. On partitioned data sets, ABR will set the blocksize to a higher value, but will not actually reblock the members.

BLKF= specifies a value of 1 to 10. 1 is full track blocking (max 32760) 2 half track, to 10 for a tenth of a track blocking. On fixed files ABR will round down to a multiple of the LRECL.

Default is that ABR will not reblock data sets. The restore will fail if the input data set has blocks larger than the track size of the output disk.

**BYPASSACS**

On a system with SMS (System Managed Storage) active, specifies that the SMS ACS (Automatic Class Selection) routines are not to be invoked for data sets which must be allocated by ABR. If a data set has a SMS storage class assigned (see STORCLAS= in [Section 20.08](#)) it will be SMS-managed, and SMS will be invoked to allocate the data set on an SMS-chosen volume, but SMS will not be allowed to override the storage class or management class assigned to the data set.

Default is that on an SMS system, the SMS ACS routines will be invoked for every data set which has to be allocated. The assigned storage and management classes will be passed to those routines, which can approve or override them. A data set will be passed to SMS for allocation if the storage class ACS routine assigns a storage class to the data set.

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**BYPASSSMS**

On a system with SMS (System Managed Storage) active, specifies that ABR is to directly allocate data sets on SMS-managed volumes, bypassing normal SMS storage group and volume selection. The selected output volume must be a SMS-managed disk volume, and the data sets being restored must have a SMS storage class assigned (see BYPASSACS above and STORCLAS= in [Section 20.08](#)). ABR will allocate and catalog the data sets according to SMS standards.

Normal SMS facilities do not allow allocation of data sets on specific volume serials, but BYPASSSMS will do so, allowing data sets to be located for performance or other reasons. Note that if BYPASSACS is also specified, the assigned SMS classes will not be validity- or authority-checked.

Default is that on an SMS system, for data sets which are SMS-managed and allocated by ABR, the SMS storage group ACS routine will be invoked to select a storage group and SMS will select a SMS-managed volume and allocate and catalog the data sets.

BYPASSACS and BYPASSSMS are primarily for use by storage administration personnel, since they bypass normal SMS allocation controls and rules. In order to use BYPASSACS or BYPASSSMS, the user of ABR must be authorized to the RACF profile

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in class FACILITY, or the equivalent in other security systems.

**CATBYPERR**

Specifies that, if the CATDSN= operand is used on SELECT statements, any error messages caused by trying to access catalogs which are OS CVOLS, or which have OPEN errors, will be suppressed; those catalogs will simply be bypassed.

Default is that CVOL and OPEN errors will be reported.

**CATIFALLOC**

Specifies that non-VSAM output data sets will be cataloged by ABR even if they were preallocated (not allocated by ABR); the output data set will be cataloged if it is not already cataloged on another volume (unless the RECAT operand was specified).

Default is that ABR will catalog the output data sets only when it allocates them.

**COPY=**

Specifies the copy of the backup from which the restore is to be attempted; "n" can be any digit from 1 to 9. COPY=2 can be specified if a duplicate backup (TAPExx) created at backup time. Copies 2 through 9 can be created by the FDRTCOPY utility ([See Section 10.20](#)).

Default is COPY=1 unless overridden in the FDR/ABR Global Option table ([See Section 91 or 92](#)).

**DATA=**

**ALL** — specifies that ABR will restore the entire data set from the backup. Normally, ABR will only restore up to the last block pointer (end-of-file) on PS or PO data sets. Should be used if the last block pointer is invalid. This option should not be specified unless the backup was a full volume backup (defaulting to DATA=ALL), or DATA=ALL was specified on the data set backup. On a restore to an unlike device type, DATA=ALL is ignored. DATA=ALL should not be specified with RLSE and %FREE.

Default is USED.

**DD=ALL**

Specifies that ABR is to scan all the DISKxxxx DD statements for the DSNNAME coded. ABR will attempt to restore these data sets, unless they are temporary data sets, processing them as though they had been requested on a SELECT command that specified DSN= with no other operands.

DSNENQ=NONE is the default for these data sets.

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**DSNENQ=**

Specifies that ABR is to enqueue all of the data sets being restored. ABR will issue an exclusive enqueue with a major name of 'SYSDSN' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, ABR will issue a warning message for the data set. The data set will not be restored. A condition code will be set at the end of the ABR execution unless ENQERR=NO is specified. ABR will not enqueue on data sets which it has allocated.

**TEST** – The data sets will only be tested to see if they are active at the time the restore starts. The data set will not be enqueued.

**USE** – The data sets will be enqueued for the duration of the restore. If not available, the data set will not be restored.

**HAVE** – The data sets will be enqueued for the duration of the restore. If not available, ABR will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. If WAIT is specified, ABR will wait for the data set to become available. The job could time out. If NOWAIT is specified, ABR will print a warning message for the data set and will not restore the data set. If RETRY is specified, ABR will attempt the enqueue again.

**NONE** – No data set ENQ will be issued.

**NOTE:** If the data set is specified in a DD statement in the ABR job with DISP=SHR, ABR will change the scheduler enqueue for the data set to EXCLUSIVE (DISP=OLD) if the user specifies TEST, USE or HAVE. The operator cannot respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.

**CAUTION:** This option should not be used on shared DASD unless a cross-system enqueue facility is available and the SYSDSN QNAME is broadcast across systems. Without this capability, ABR can only determine which data sets are active on the system ABR is running on.

Default is TEST.

**DYNTAPE  
DYNTAPE2**

Specifies that ABR is to dynamically allocate the backup medium. ABR will use a DDNAME of TAPE#. This option should be used if the backup is on disk or a mix of backup mediums are to be used (ex: 3400, 3480 or disk). Do not use DYNTAPE and TAPEDD= in the same execution.

DYNTAPE2 will allocate 2 drives which will improve performance when restoring from multi-volume tape backups. DYNTAPE2 should not be used if backup files on disk might be involved.

Default is that ABR will use the first TAPE# DD statement found, unless TAPEDD= was specified.

**ICFCAT=**

ICF VSAM files only. Specifies the source of the catalog name to be used by ABR if an output ICF VSAM cluster is to be allocated.

**ORIGINAL** — on a restore to the same name, specifies that ABR is to use the catalog in which the original dumped cluster was cataloged.

On a restore to a new name, ICFCAT=ORIGINAL is ignored, and ICFCAT=ALIAS normally is used. If it is desired to catalog the output cluster into the same catalog as the input cluster, the user must specify ICFCAT=STPCAT, and must supply a STPCAT DD statement pointing to that catalog.

**STPCAT** — specifies that ABR is to use the STPCAT as the catalog. If a STPCAT DD statement is not supplied, ABR will use the master catalog or the catalog which is aliased for this data set in the master catalog.

**ALIAS** — specifies that ABR is to determine the catalog from the alias name in the master catalog. If no alias is found, and the cluster is being restored to the same name, ABR will use the input cluster's catalog. If no alias is found, and the cluster is being restored to a new name, ABR will use the STPCAT (if present in the JCL) or the master catalog. Multi-level alias is supported. Default: ORIGINAL, except that if the cluster is being restored to a newname (NEWGROUP or NEWINDEX specified) the default is ALIAS. If the output cluster is SMS-managed, ALIAS is forced.

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<b>MAXCARDS=</b>	<p>Enables ABR to accept additional SELECT and EXCLUDE commands during this execution.</p> <p>Default is 100 SELECT and EXCLUDE Commands.</p>
<b>NOCAT RECAT</b>	<p>NOCAT specifies that ABR will not catalog any output data sets. This option is ignored for ICF VSAM clusters and SMS-managed data sets, since these must always be cataloged.</p> <p>RECAT specifies that ABR should catalog non-VSAM output data sets even if they are currently cataloged to another volume.</p> <p>Default: ABR will catalog output non-VSAM data sets unless they are currently cataloged to another volume. Allocation of SMS-managed data sets will fail if they cannot be cataloged.</p> <p>NOTE: NOCAT and RECAT are mutually exclusive. ABR will normally only attempt to catalog output data sets which it allocates (not pre-allocated) unless the CATIFALLOP operand is specified.</p>
<b>OPERATOR</b>	<p>Specifies that an operator message (FDRW24) will be issued for each tape necessary to complete the restore. This option gives the operator the ability to bypass a tape which may not be available at this time.</p>
<b>PRESTAGE</b>	<p>Specifies that ABR is not to restore a data set if the output data set already exists on the selected output volume. This may be used to avoid restoring data sets which have already been restored.</p> <p>Default is that ABR will restore to pre-allocated data sets, overlaying the existing contents of those data sets. If the data sets do not exist, they will be allocated.</p>
<b>RLSE %FREE=</b>	<p><b>RLSE</b> specifies that ABR is to release all of the unused space in the output data sets for selected PS and PO data sets.</p> <p><b>%FREE=nn</b> — specifies a percentage (nn%) of the PS and PO data sets to be left free after the restore. The data sets will not be expanded in size from the original allocation of the input data set. nn may range from zero (0) which will free all of the free space (same as RLSE) to 99 which will attempt to leave the data sets with 99% free space.</p> <p>Space will be released only from data sets allocated by ABR.</p> <p>Default is that ABR allocate the output data sets the same size as the input data sets (unless overridden by TRK=/CYL= on the SELECT statement).</p>
<b>SELTERR=</b>	<p><b>NO</b> — specifies that ABR is not to set a condition code if a SELECT statement is not referenced.</p> <p><b>YES</b> — specifies that ABR will set a condition code at the end of the RESTORE if any SELECT/EXCLUDE statement specified a data set which could not be found.</p> <p>Default is YES unless overridden in the FDR/ABR global option table (<a href="#">See Section 91 or 92</a>).</p>

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## 50.08 CONTINUED . . .

**SMSGDG=**

Specifies the status of SMS-managed GDG (Generation Data Group) data sets, if allocated by ABR.

**DEFERRED, ACTIVE, or ROLLEDOUT** will set the GDG to that status.

**INPUT** will set the GDG to the original SMS status of the GDG generation, as recorded on the backup tape. If the original GDG was non-SMS, it will be set **ACTIVE** if that generation is **currently** cataloged, otherwise **DEFERRED**.

Default is **DEFERRED**.

**VRECAT**

Allows ICF VSAM clusters to be allocated and cataloged even if they already exist in the target ICF catalog. If the output cluster does not exist on the output volume selected, but the cluster name is in the catalog, the cataloged cluster will be scratched (by **DELETE** or, if that fails, **DELETE NOSCRATCH**).

**VRECAT** is useful when restoring a cluster when its catalog has been restored, but the cluster on disk has not, or when restoring a cluster to a new volume. **VRECAT** is ignored for ICF catalogs and when the restore does not include the base data component.

Default is that ICF VSAM clusters cannot be allocated if the cluster name already exists in the catalog (even if the catalog points to the output volume).

**WARNING: VRECAT will DELETE the original cluster, with all its components, alternate indexes and PATHs, from the catalog and disks. If the DELETE fails for some reason, the DELETE NOSCRATCH may leave uncataloged components on disk.**

## 50.09 SELECT COMMAND FOR DATA SET RESTORE OPERATION

```

SELECT  DSN=filter | CATDSN=filter | DD=ddnameALLDSN
      S  ,BLKF=nn
EXCLUDE ,CATALOG=catname | ,MCATALOG=catname
      X  ,CATBYPERR
        ,CATLIMITGDG=n
        ,COPY=n
        ,CYCLE=nn
        ,DATA=ALL
        ,DATACLAS=dataclass | ,NULLDATACLAS
        ,DSNENQ=NONE
        ,MGMTCLAS=managementclass | ,NULLMGMTCLAS
        ,GEN=nnnn
        ,NEWNAME=newdsname | ,NEWGROUP=newgroup | ,NEWINDEX=new index |
        ,NEWDD=ddname
        ,NOCAT | ,RECAT
        ,NOTIFY=userid
        ,NVOL=(vvvvvv,vvvvvv,...)
        ,OLDBACKUP=nn
        ,PRESTAGE
        ,PRTALIAS
        ,RLSE,%FREE=nn
        ,STORCLAS=storageclass | ,NULLSTORCLAS
        ,TAPEDD=x
        ,TRK=nnnnn | ,CYL=nnnnn
        ,VOL=vvvvvv
        ,VRECAT

```

CONTINUED . . .



## 50.09 CONTINUED . . .

**SELECT  
DATA SET  
COMMAND  
FOR RESTORE**

This control statement selects the data sets to be restored from full-volume or incremental backups. The **SELECT** command identifies the individual data set name or group of data sets to be processed. The **EXCLUDE** command identifies data sets from within those selected by **SELECT** statements which are not to be processed. As described in [Section 52.04](#), ABR will select the backups of the selected data sets using information in the VTOC of the data set's volume or the ABR scratch catalog, locate the indicated backup on tape or disk, and restore it. **EXCLUDE** statements should only contain the operands **DSN=**, **DD=**, **ALLDSN**, **VOL=**, or **TAPEDD=**. A maximum of 100 of these control statements may be used in one execution unless overridden by **MAXCARDS=**.

**The control statements are always scanned in the order in which they were input, so in general, EXCLUDE statements should precede SELECT statements.** Since ABR will only restore data sets which are selected, **EXCLUDE** statements are required only to exclude certain data sets from within a larger group on a **SELECT** statement.

Example 1. Select all data sets with a first index of "A" except those with a second index of "B":

```
EXCLUDE   DSN=A. B. **
SELECT    DSN=A. **
```

Example 2: Select all data sets on volume TSO001 except those beginning with "ABC":

```
EXCLUDE   DSN=ABC**
SELECT    ALLDSN, VOL=TSO001
```

**NEWNAME/  
NEWGROUP/  
NEWINDEX for  
ICF VSAM**

If you are restoring to a pre-allocated ICF VSAM cluster, where the cluster name is the same as the original, but the components may be named differently (especially if the component names were defaulted and assigned "timestamp" names prior to DFP V3), you must specify the cluster name as both **DSN=** and **NEWNAME=**; this causes ABR to **LOCATE** the new component names. **NEWNAME=** cannot be specified for clusters with more than one alternate index.

If restoring an ICF VSAM cluster to a new name, if the new cluster must be allocated, you should specify **NEWGROUP=** or **NEWINDEX=**. ABR will modify both the cluster and component names. This is illustrated in [Section 20.11](#).

VSAM catalogs and VVDSs cannot be restored to a **NEWNAME**. ABR will properly restore a VSAM catalog even if it has been re-allocated thereby generating a new **CATINDEX** name.

[See Section 52.11](#) for VSAM SPECIAL CONSIDERATIONS.

**OPERANDS****DSN=**

Specifies a fully-qualified data set name or a filter to be used for generic data set selection, as described in [Section 52.16](#). This name or filter will be used when scanning for data sets to be restored.

If **DSN=** specifies a filter (not a fully-qualified name), then one specific backup file must be identified, either by the **VOL=**, **GEN=** and **CYCLE=** operands, or the **TAPEDD=** operand. Any data set whose name starts with these characters, that is encountered on the backup file, will be restored.

EXAMPLES:     **DSN=**USER1. JCL. CNTL  
                  **DSN=**PROD++. \*. LI B\*

**CATDSN=**

**NOTE:** The **DSG=** operand documented in previous versions of FDR/ABR is still accepted, but the **DSN=** operand with a generic data set name filter is the preferred way of selecting groups of data sets.

Specifies filter to be used for generic data set selection from system catalogs, as described in [Section 52.16](#). A fully-qualified name can be specified, and it will work the same as **DSN=** except that specification of a relative generation number for GDG data sets is supported (e.g., **CATDSN=A.B(—1)**).

Catalogs will be scanned for all cataloged data sets matching the filter, and they will be processed as if a **SELECT DSN=dsname** was present for each of them. It may be necessary to specify **MAXCARDS=nnnnn** if a large number of data sets are selected by the filter. **Additional considerations for CATDSN=filter are explained in Section 52.16.**

**CATDSN=** is supported only on **SELECT** statements. The **VOL=** operand must not be specified with **CATDSN=**.

Normally **CATDSN=** will not display the data sets it selects from the catalogs, you will see the names only when ABR actually finds and selects the data sets. To display all of the data sets selected, and to also display the names of the catalogs which were searched, specify **PCATDSN=filter**.

**WARNING:** depending on the filter specified, **CATDSN=** may need to search many catalogs.

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## 50.09 CONTINUED . . .

<b>DD=</b>	Specifies that ABR is to obtain the name of the data set to be restored from the specified DD statement. Only the data set name from the DD statement is used; ABR will use its usual techniques to locate the volume serial.
<b>ALLDSN</b>	<p>All data sets found on a specified backup file are to be restored. To use ALLDSN one specific backup file must be identified, either by the VOL=, GEN= and CYCLE= operands, or the TAPEDD= operand.</p> <p>NOTE: DSN=, CATDSN=, DD= and ALLDSN are mutually exclusive. One and only one must be specified.</p> <p>ICF VSAM NOTE: For ICF VSAM, the search is for the base cluster name. The 'SYS1.VVDS' data set will be bypassed if specified using the ALLDSN or DSN=filter operands. <a href="#">See Section 52.11</a> for further details.</p>
<b>BLKF=</b>	<p>Specifies that ABR is to reblock PS fixed and variable format and PO data sets. Except when restoring a PS file to a smaller disk the blocking factor must result in a larger blocksize, otherwise it will be ignored. On partitioned data sets, ABR will set the blocksize to a higher value, but will not actually reblock the members.</p> <p>BLKF= specifies a value of 1 to 10. 1 is full track blocking (max 32760), 2 half track, to 10 for a tenth of a track blocking. On fixed files ABR will round down to a multiple of the LRECL.</p> <p>Default is that ABR will not reblock data sets unless BLKF= was specified on the RESTORE statement. The restore will fail if the input data set has blocks larger than the track size of the output disk.</p>
<b>CATALOG=</b> <b>MCATALOG=</b>	<p>Specifies the name of a user catalog (CATALOG=) or alternate master catalog (MCATALOG=) to search when CATDSN= is specified. <a href="#">See Section 52.16</a> for details.</p> <p>Default is that the catalog search will start with the active master catalog. User catalogs will be searched if their assigned aliases match the CATDSN=filter.</p>
<b>CATBYPERR</b>	<p>Specifies that, if the CATDSN= operand is used on SELECT statements, any error messages caused by trying to access catalogs which are OS CVOLS, or which have OPEN errors, will be suppressed; those catalogs will be simply bypassed.</p> <p>Default is that CVOL and OPEN errors will be reported unless CATBYPERR was specified on the DUMP statement.</p>
<b>CATLIMITGDG=</b>	<p>May be used with CATDSN=filter to limit the selection of GDGs from the catalogs. It will not affect the selection of cataloged non-GDG data sets, but if the filter selects a GDG then:</p> <p><b>n</b> will cause only the most recently created "n" generations to be selected.</p> <p><b>- n</b> will cause only generation (- n) to be selected.</p> <p>Default is that all the generations of selected GDGs will be selected (unless a relative generation number is specified at the end of the filter, e.g., CATDSN=filter(- 2)).</p>
<b>COPY=</b>	<p>Specifies the copy of the backup from which the restore is to be attempted; "n" can be any digit from 1 to 9. COPY=2 can be specified if a duplicate backup (TAPExx) created at backup time. Copies 2 through 9 can be created by the FDRTCOPY utility (<a href="#">See Section 10.20</a>).</p> <p>Default is the value from the RESTORE statement or from the FDR/ABR Global Option table (<a href="#">See Section 91 or 92</a>).</p>
<b>CYCLE=</b>	<p>Specifies the cycle number of the backup ABR is to use to restore this data set. This cycle number is the last two digits of the tape data set name. This value is printed by the ABR reports. Use this option if a data set was scratched and was not recorded in the SCRATCH Catalog, or if you wish to restore from other than the most current backup. Specifies a value of zero to 63.</p> <p>OLDBACKUP, if enabled, can also be used to specify an older backup.</p>

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## 50.09 CONTINUED . . .

<b>DATA=</b>	<p>ALL — Specifies that ABR will restore the entire data set from the backup. Should be used if the last block pointer is invalid. This option should not be used unless the backup was a full volume backup (defaulting to DATA=ALL), or DATA=ALL was specified on the data set backup.</p> <p>DATA=ALL should not be specified with RLSE or %FREE.</p> <p>Default is USED — ABR will restore only the used tracks of PS and PO data sets, unless DATA=ALL was specified on the RESTORE statement.</p>
<b>DATACLAS=</b> <b>NULLDATACLAS</b>	<p>On a system with SMS active, specifies the SMS data class to be associated with the data set being restored, overriding the original data class of the data set (if any).</p> <p>NULLDATACLAS changes the data class to null (not specified).</p> <p>Default is that the original data class of the input data set (if any) will be associated with the output data set if it is allocated as SMS-managed.</p>
<b>DSNENQ=</b>	<p><b>NONE</b> — specifies that ABR is not to test to see if the data set being restored is currently active.</p> <p>Default is DSNENQ=TEST unless DSNENQ= was specified on the RESTORE statement; If another job or user has the data set allocated, ABR will not restore the data set.</p>
<b>GEN=</b>	<p>Specifies the generation of backup ABR is to use. If GEN is used, CYCLE must also be specified. This value is the 'gggg' portion of the tape data set name, which has the Format FDRABR.Vvvvvv.Cnggggcc. This option is used to restore from a previous generation of backups or if the information ABR recorded is incorrect. Specifies a value from 1 to 9999.</p>
<b>MGMTCLAS=</b> <b>NULLMGMTCLAS</b>	<p>On a system with SMS active, specifies the SMS management class to be presented to the SMS management class ACS routine for the data set being restored, overriding the original management class of the data set (if any). The ACS routine may accept or override this class.</p> <p>NULLMGMTCLAS changes the management class to null (not specified).</p> <p>Default is that the original management class of the input data set (if any) will be passed to the ACS routine for the output data set if it is allocated as SMS-managed.</p>

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## 50.09 CONTINUED . . .

<b>NEWNAME= NEWN=</b>	Specifies that ABR is to restore the data set to a new name. NEWNAME should only be used with DSN= or DD=, and should not be used for ICF VSAM clusters if they must be allocated. If the newname ends in a GDG relative generation number, e.g., NEWNAME=gdgname(-1), a LOCATE will be done to get the proper absolute generation number.
<b>NEWGROUP= NEWG=</b>	Specifies that the data sets are to be restored using a new group name. The number of characters specified will replace left to right the data set name. Care should be taken when periods are used that index levels are not incorrectly changed. ABR will check the new names for valid IBM standards.  EXAMPLE:        SELECT    DSN=ABC** , NEWG=XYZ  Any data sets restored will be renamed starting with characters XYZ.
<b>NEWINDEX= NEWI=</b>	Specifies that the data set is to be restored with one or more index levels being added or replaced in the original name. ABR will use each index level specified in NEWI in place of the original index level. If a period is specified without any characters preceding, ABR will copy the original index level. If + is specified, ABR will insert the characters following a plus as a new index level. If ++ is specified, ABR will add the characters following the plus-plus to the end of the original name. If — is specified, ABR will drop an index level and it's preceding period from the original name.  ABR will check the new names for valid IBM standards.  EXAMPLE:        SELECT    DSN=A. B. C, NEWI =XYZ. ++END will result in the newname 'XYZ.B.C.END'  SELECT    DSN=PAY. MASTER. **, NEWI =. TESTMAST will result in the newname 'PAY.TESTMAST.xxxxx '  SELECT    DSN=A. B. C. D. NEWI =. - - - X will drop the middle two index levels and replace the last, resulting in newname 'A.X'  If the NEWINDEX value ends in a GDG relative generation number, e.g., NEWI=..NEWMAS(—2), that relative number will be added to the end of the newname, and a LOCATE done to get the proper absolute generation number.
<b>NEWDD=</b>	Specifies the name of a DD statement from which ABR will obtain the NEWNAME for the restore.  NOTE: NEWN=, NEWG=, NEWI=, NEWDD= are mutually exclusive. If none of them are specified, the data set will be restored using the original name. NEWN= and NEWDD= should not be used on SELECT statements which select more than one data set.
<b>NOCAT RECAT</b>	<b>NOCAT</b> specifies that ABR will not catalog any output data sets selected by this statement. This option is ignored for ICF VSAM clusters and SMS-managed data sets, since these must always be cataloged.  <b>RECAT</b> specifies that ABR should catalog non-VSAM output data sets selected by this statement even if they are currently cataloged to another volume.  Default: ABR will catalog output non-VSAM data sets unless they are currently cataloged to another volume, unless overridden by NOCAT/RECAT on the RESTORE statement.  NOTE: NOCAT and RECAT are mutually exclusive. ABR will normally only attempt to catalog output data sets which it allocates (not pre-allocated) unless the CATIFALLOP operand is specified.
<b>NOTIFY=</b>	Specifies that ABR is to notify the USERID specified at the completion of the restore. The USERID is from 1 to 7 characters.

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## 50.09 CONTINUED . . .

**NVOL=**

Specifies the volume serials for output disk volumes to which data sets selected by this statement are to be restored. A single volume serial may be specified as NVOL=volser or multiple volume serials may be specified:

- 1) A list of volume serials may be given, enclosed in parentheses, e.g.,

NVOL=(TSO001,TSO002,TSO003)

- 2) A volume group may be specified by placing an asterisk at the end of the volser prefix, e.g.,

NVOL=TSO\*

- 3) The two may be combined, e.g.,

NVOL=(TSO\*,PROD\*,ABC001)

- 4) All online disk volumes may be selected by NVOL=\*

Volume serials which are not online will be ignored. ABR will attempt to allocate the output data sets on the first volume specified. If an allocation fails, it will be retried on the next volume in the list (in ascending device address order) until it succeeds (or until it fails on 64 volumes). If the list contains several disk device types, "like" volumes (same type as the data set being restored) will be tried first, then unlike devices.

Specifying multiple volsers or a group allows ABR to restore data sets in one pass even when no one volume has available space to contain them all.

Default is that the output volume will be selected by rules defined in [Section 50.08](#). Note that when NVOL= is specified, and data sets are selected which are currently allocated and cataloged, ABR will restore them to the new volumes, and not to the volume on which they are cataloged.

On a system with SMS active, NVOL= may be ignored if the data set does not exist on the volume specified and the data set is SMS-managed (see STORCLAS= ).

**OLDBACKUP=**

Specifies that ABR is to restore from a backup of this data set taken nn backups ago. OLDBKUP must be enabled in the ABR model DSCB on the volume involved. nn is from 0 to the maximum number of old backups recorded for the data set. "1" specifies the backup taken prior to the current backup for this data set, "2" the next oldest, etc. If not specified (or 0) the most current backup will be restored unless GEN= and CYCLE= or TAPEDD= are specified.

(See [Section 52](#) Data Set Restore Rules for further explanation).

**PRESTAGE**

Specifies that ABR is not to restore a data set if the output data set already exists on the selected output volume. This may be used to avoid restoring data sets which have already been restored.

Default is that ABR will restore to pre-allocated data sets, overlaying the existing contents of those data sets, unless PRESTAGE was specified on the RESTORE statement.

**PRTALIAS**

When used on a SELECT statement with CATDSN= it will display all of the alias names and user catalogs which were searched.

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## 50.09 CONTINUED . . .

**RLSE**  
**%FREE=**

**RLSE** — specifies that ABR is to release all of the unused space in the output PS and PO data sets selected by this statement.

**%FREE=nn** — specifies a percentage (nn%) of the PS and PO data sets to be left free after the restore. The data sets will not be expanded in size from the original allocation of the input data set. nn may range from zero (0) which will free all of the free space (same as RLSE) to 99 which will attempt to leave the data sets with 99% free space.

Space will be released only from data sets allocated by ABR.

Default is that ABR allocate the output data sets the same size as the input data sets (unless overridden by TRK=/CYL= on the SELECT statement or by RLSE/%FREE= on the RESTORE statement).

**STORCLAS=**  
**NULLSTORCLAS**

On a system with SMS active, specifies the SMS storage class to be presented to the SMS storage class ACS routine for the data set being restored, overriding the original storage class of the data set (if any). The ACS routine may accept or override this class.

NULLSTORCLAS changes the storage class to null (not specified).

Default is that the original storage class of the input data set (if any) will be passed to the ACS routine for the output data set.

If the storage class ACS routine assigns a storage class to this data set, the data set will be allocated as SMS-managed.

**TAPEDD=**

Specifies the same character as specified in a TAPEX DD statement. This option is used to override ABR's selection of the backup tape from which to restore this data set. A TAPEX DD statement must be provided giving all the values necessary to point to the file to be restored from.

EXAMPLE:

```
//TAPEA      DD      DSN=FDRABR. VSCRO10. C1000101,
//              DI SP=OLD, LABEL=( 2, SL) ,
//              UNI T=( TAPE, , DEFER) ,
//              VOL=SER=000150
//SYSI N      DD      *
      RESTORE  TYPE=ABR
      SELECT   DSN=ABC, TAPEDD=A
```

NOTE: If more than one backup tape is to be restored, UNIT=AFF=TAPEX should be specified. Also, if normal restore is requested in the same execution, the first tape DD statement is used by ABR for these restores. TAPEDD must not specify this tape.

Do not use DYN TAPE and TAPEDD in the same execution.

**TRK=**  
**CYL=**

If ABR is to allocate the data set, specifies the number of cylinders or tracks to be used for the space allocation. On PS or PO files when DATA=ALL was not specified, this value should be at least equal to the used portion of the data set. On all other types of files and when DATA=ALL is specified, this value should be equal to or greater than the original size of the file. For ICF VSAM clusters, modifies the size of the base data component only. If the space is too small for the data being restored, ABR will extend the file for non-VSAM.

Default is that ABR will use the original size of the data set.

**VOL=**

Specifies the disk volume serial number from which the data set name was dumped. VOL= must be specified if the original data set is not cataloged or recorded in the Scratch Catalog. If NEWN= and NVOL= are not specified, the data set will be restored in place.

(See Data Set Restore Rules in [Section 52](#) for a more detailed explanation).

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## 50.09 CONTINUED . . .

**VRECAT**

Allows ICF VSAM clusters to be allocated and cataloged even if they already exist in the target ICF catalog. If the output cluster does not exist on the output volume selected, but the cluster name is in the catalog, the cataloged cluster will be scratched (by DELETE or, if that fails, DELETE NOSCRATCH).

VRECAT is useful when restoring a cluster when its catalog has been restored, but the cluster on disk has not, or when restoring a cluster to a new volume. VRECAT is ignored for ICF catalogs and when the restore does not include the base data component.

Default is that ICF VSAM clusters cannot be allocated if the cluster name already exists in the catalog (even if the catalog points to the output volume) unless VRECAT was specified on the RESTORE statement.

NOTE: VRECAT is especially useful at a disaster-recovery site, when catalogs have been restored but the volumes have not.

**WARNING: VRECAT will DELETE the original cluster, with all its components, alternate indexes and PATHs, from the catalog and disks. If the DELETE fails for some reason, the DELETE NOSCRATCH may leave uncataloged components on disk.**

**50.10 The FULL VOLUME RESTORE Command**

**RESTORE**    **TYPE=FDR**  
**R**            **,CONFMESS=YES / NO**  
               **,COPY=n**  
               **,CPYVOLID=NO / YES**  
               **,DYNTAPE, | DYNTAPE2**  
               **,MAXERR=nn**  
               **,OPERATOR**  
               **,SMSPROT=ALL / NONE**  
               **,VOLRESET=YES / NO**

**RESTORE**    The RESTORE Command with TYPE=FDR activates a restore of entire packs. Only one  
**COMMAND**    RESTORE statement is allowed per execution of ABR.

**ABR FULL**    ABR will recreate an entire volume from all of the backup files in a generation starting with the most  
**VOLUME**    recent cycle and working back to the full volume backup. ABR will only restore the most current  
**RESTORE**    copy of each data set. The VTOC will be restored from the most current cycle. ABR will  
**PROCEDURE**    automatically request the volumes necessary for the restore. In this way, ABR will recreate the pack  
                   as if a full volume dump was taken at the time of the last incremental dump. If the last backup was  
                   a TYPE=DSF manual, ABR will automatically bypass this file since it does not contain a copy of the  
                   VTOC. If a TYPE=DSF manual dump file is encountered after the first incremental backup, ABR will  
                   process those data sets.

CAUTION: If data sets have been excluded from incremental backups, they will not be restored to  
                   the most current level, unless they have been unchanged since the full- volume backup  
                   at the beginning of the generation. This is true if the data set was excluded using the  
                   protect list, EXCLUDE Command, the OPTIONS=EX attribute, or the NOVSAM  
                   operand.

**SIMULATED**    SIMREST is not supported using the full volume restore command. If you wish to see which backup  
**FULL VOLUME**    volumes FDR would restore from, use program FDRABRP with the command PRINT  
**RESTORE**        CATLG,VOL=vvvvvv (See Section 53.06).

**OPERANDS**    **TYPE=FDR**        Specifies a request for a full volume restore. ABR will restore the most current  
                   copies of all the data sets that resided on the volume at the time of the last  
                   incremental or full-volume backup. ABR will recreate all of the volumes  
                   specified by the SELECT Commands. A DISKxxxx DD must be provided for  
                   each output volume.

**CONFMESS=**    **YES** — specified that, before beginning the restore, ABR will request  
    confirmation via a WTOR message to which the operator must reply.  
    **NO** — suppresses the WTOR and begins the restore immediately.  
    Default is YES.  
    NOTE: This feature can be very useful at a disaster recovery site to avoid full  
    volume restores being delayed waiting for an operator response.

**COPY=**        Specifies the copy of the backup from which the restore is to be done; "n" is a  
    digit from 1 to 9. COPY=2 can be specified if a duplicate tape copy (TAPExx)  
    was created at backup time. Copies 2 through 9 can be created by the  
    FDRTCOPY utility (See Section 10.20).  
    If COPY=1 or 2 and ABR finds that one of the backup tapes is not cataloged  
    under the copy specified, ABR will check to see if the other copy was created.  
    If cataloged, ABR will use the other copy.  
    Default is COPY=1 unless overridden in the FDR/ABR Global Option table  
    (See Section 91 or 92).

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## 50.10 CONTINUED . . .

- CPYVOLID=** Specifies whether ABR is to restore the volume serial number from the tape.  
**YES** — specifies that the volume serial number of the pack that was dumped will be restored. The volume will be set offline or unloaded if a duplicate volume serial currently exists on the system.  
**NO** — specifies that the disk volume being restored to will retain its volume serial number.  
 Default is NO.
- DYNTAPE**  
**DYNTAPE2** Specifies that ABR is to dynamically allocate the backup file, using a DDNAME of TAPE#. This option is necessary if the backups are on different types of devices.  
 DYNTAPE2 will allocate 2 drives which will improve performance when restoring from multi-volume tape backups. DYNTAPE2 should not be used if backup files on disk might be involved.  
 NOTE: Use of DYNTAPE or DYNTAPE2 is recommended when restoring multiple volumes concurrently (e.g., for disaster/recovery) to avoid problems due to the same tape volumes being required for more than one restore.
- MAXERR=** Specifies the number of tape or disk errors that are to be allowed by ABR prior to abending the RESTORE operation. MAXERR may specify a value from 1 to 9999 errors. Each error will be indicated by a message and possible MINI DUMP.  
 Default is 20 errors.
- OPERATOR** Specifies that, before the RESTORE operation began, an operator message will be issued for each tape necessary to complete the restore. This option gives the operator the ability to bypass individual cycles for which the tapes may not be available at this time.
- SMSPROT=** **ALL** — enforces several rules when SMS-managed volumes are involved: Backups of SMS-managed volumes can only be restored to SMS-managed volumes, and non-SMS volumes only to non-SMS volumes. CPYVOLID=YES is forced when an SMS-managed volume is restored.  
**NONE** — allows the restore of SMS-managed volumes to non-SMS volumes, and vice versa. Also allows the restore of SMS volumes to new volsers if CPYVOLID=NO is specified. This option should be used with caution.  
 Default is ALL.  
 NOTE: SMSPROT=NONE may be useful at a disaster recovery site when it is necessary to restore SMS volumes on a startup system without SMS active.
- VOLRESET=** **YES** — specifies that ABR at the end of a RESTORE operation will rename the SYS1.VTOCIX data set and the ABR model DSCB to the new volume serial number, if the volume serial number specified within the data set name matches the volume serial of the pack that was backed up. Also the volume serial field in each format 1 DSCB will be reset if it matches the original volume serial. Also the cycle number in the ABR model DSCB will be set to the cycle number from which you are restoring, except that on a restore by TAPEDD the cycle number will be set to 63 in order to resynchronize the generations by forcing a full volume backup on the next TYPE=ABR or TYPE=DSF backup  
**NO** — specifies that ABR will not rename the above data sets. If the volume will be clipped back to its original volume serial, specify NO. Specifying NO will also inhibit adjusting the cycle number in the ABR model DSCB, the ABR model DSCB will be restored exactly as it appeared at the beginning of the backup from which you are restoring, that is, it will reflect the preceding cycle.  
 Default is YES.  
 VSAM WARNING: If the serial number is changed on a volume which contains VSAM files any VSAM clusters on this volume will be inaccessible. Also, ABR will not reset the VOLSER in the VVDS, since the VVDS and the catalogs contain self-defining records which would also need resetting.



## 50.11 SELECT COMMAND FORMAT FOR FULL VOLUME RESTORES

**SELECT**    **VOL=vvvvvv**  
**S**            **,COPY=n**  
              **,CYCLE=nn**  
              **,GEN=nnnn | CURRENT**  
              **,NVOL=vvvvvv**  
              **,TAPEDD=x**

**SELECT**    The SELECT Volume Command must be specified to indicate the volume serial of the original  
**VOLUME**    volume which is to be recreated from the backup sub-system. One or more SELECT Commands  
**COMMAND**    may be specified; the disk volumes will be restored one at a time.

<b>OPERANDS</b>	<b>VOL=</b>	Specifies the disk volume serial number of the original disk to be restored. VOL= must be specified on a full volume restore. If NVOL= is not specified, the volume will be restored to a disk volume with the same serial and a DISKxxxx DD statement must be provided pointing to that volume.
	<b>COPY=</b>	Specifies the copy of the backup from which the restore is to be done; "n" is a digit from 1 to 9. COPY=2 can be specified if a duplicate tape copy (TAPExx) was created at backup time. Copies 2 through 9 can be created by the FDRTCOPY utility ( <a href="#">See Section 10.20</a> ).  If COPY=1 or 2 and ABR finds that one of the backup tapes is not cataloged under the copy specified, ABR will check to see if the other copy was created. If cataloged, ABR will use the other copy.  Default is the value from the RESTORE statement or from the FDR/ABR Global Option table ( <a href="#">See Section 91 or 92</a> ).
	<b>CYCLE=</b>	Specifies the maximum cycle number ABR is to restore from. This option is used if the user does not wish to restore from the most recent cycle created or if GEN=gggg is specified. ABR will start from this backup file and continue backwards until the full volume (FDR) backup. CYCLE=0 will only restore the full volume backup.
	<b>GEN=</b>	Specifies the generation number to be restored from. May be used if you wish to restore from a specific generation other than the most current. If GEN=gggg is specified, CYCLE must also be specified.  If GEN=CURRENT is specified, ABR will search for the most recently created generation and cycle cataloged for this volume in the ABR catalog; the ABR model DSCB is not used and original volume need not be online. If GEN=CURRENT,CYCLE=nn is specified, then the specified cycle in the generation from the catalog will be used (CYCLE=00 can be used to restore only the full-volume backup from the current generation).  By default, ABR will read the ABR model DSCB from the volume specified by VOL= to obtain the most recently created generation and cycle. If the volume is offline, if the model does not exist or has been destroyed, or if the model indicates that no backups exist, then it will default to GEN=CURRENT and get the GEN/CYCLE from the ABR catalog.
	<b>NVOL=</b>	Specifies the new volume serial to be restored to. This volume must be specified by a DISKxxxx DD statement. If not specified, the backup will be restored to a disk with the original volume serial.
	<b>TAPEDD=x</b>	Specifies the same character as specified in a TAPEx DD statement. This option is used to override ABR's selection of the backup tapes from which to restore this volume. The TAPEx DD statement must have all the necessary parameters to point to a full volume backup file. ABR will only restore from this backup file, and not use any incremental backups.  Do not use DYNTAPE and TAPEDD= in the same execution.

## 50.12 FDRABR DUMP EXAMPLES

**FULL VOLUME  
DUMP ALL  
VOLUMES**

Take full-volume compressed backups of all disk volumes at the installation, except WORK volumes. Three TAPEX DD statements are provided, so three disk volumes will be concurrently dumped. VOL=(,,255) is specified in case any individual disk volume requires over 5 tapes. DSNENQ=USE causes ABR to print a FDR158 message for any data set that was in use at the time of the backup, but will back up the data set anyway (no abend will occur if data sets are in use). As each tape drive becomes available at the end of backing up a volume, ABR will piggyback the next disk volume as the next file on that tape.

```
//BACKUP      EXEC   PGM=FDRABR, REGI ON=6144K
//SYSPRI NT    DD     SYSOUT=*
//SYSPRI N1    DD     SYSOUT=*
//SYSPRI N2    DD     SYSOUT=*
//SYSPRI N3    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TAPE1        DD     UNI T=3480, DSN=FDR1, DI SP=( , KEEP) , VOL=( , , 255)
//TAPE2        DD     UNI T=3480, DSN=FDR2, DI SP=( , KEEP) , VOL=( , , 255)
//TAPE3        DD     UNI T=3480, DSN=FDR3, DI SP=( , KEEP) , VOL=( , , 255)
//SYSI N       DD     *
                DUMP    TYPE=FDR, ONLI NE, COMPRESS=ALL, DSNENQ=USE, ENQERR=NO
                EXCLUDE ALLDSN, VOLG=WORK
```

**NOTE: The dsnames on the TAPEX DD statements are dummy names supplied to satisfy the rules of JCL. ABR will generate the data set names for the backup files.**

**FULL VOLUME  
DUMP  
CERTAIN  
VOLUMES**

Take full-volume backup of all SYS and PROD volumes, dumping two volumes concurrently, and making two copies of each backup. The TAPE11 and TAPE22 DD statements will contain duplicate backups of those on TAPE1 and TAPE2. Two tape drives are assigned to each TAPE DD statement to minimize tape rewind wait time; VOL=(,,255) is required to cause MVS to pre-mount output tapes on the idle drives. The VTOCs of each disk volumed will be ENQed and reserved during the backups. ABR will only dump the used portion of PS or PO data sets.

```
//BACKUP      EXEC   PGM=FDRABR, REGI ON=2048K
//SYSPRI NT    DD     SYSOUT=*
//SYSPRI N1    DD     SYSOUT=*
//SYSPRI N2    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TAPE1        DD     UNI T=( TAPE, 2) , DSN=FDR1, DI SP=( , KEEP) , VOL=( , , 255)
//TAPE11       DD     UNI T=( TAPE, 2) , DSN=FDR11, DI SP=( , KEEP) , VOL=( , , 255)
//TAPE2        DD     UNI T=( TAPE, 2) , DSN=FDR2, DI SP=( , KEEP) , VOL=( , , 255)
//TAPE22       DD     UNI T=( TAPE, 2) , DSN=FDR22, DI SP=( , KEEP) , VOL=( , , 255)
//SYSI N       DD     *
                DUMP    TYPE=FDR, ENQ=RESERVE, DATA=USED
                MOUNT   VOLG=SYS
                MOUNT   VOLG=PROD
```

CONTINUED . . .

## 50.12 CONTINUED . . .

**DUMP AND  
COMPAKT  
TWO  
VOLUMES**

Take full-volume dumps of two volumes, specified by the DISK1 and DISK22 DD statement, and invoke COMPAKTOR after each dump. The CPIN22 DD statement specifies CPK control statements to be used for the COMPAKTION of volume PAY101 (DDNAME DISK22); ABR defaults for CPK options will be used for the other disk. The ABR option DSNENQ=USE will cause ABR to pass a list of active data sets to CPK; they will not be moved or restored. If the conditional COMPAKTion keywords (CPKFREEX=, CPKMULTX= and/or CPKDSNMX=) were specified on the DUMP statement, the dumps would be done normally, but the COMPAKTion would be done only if the volume dumped exceeded the criteria.

```
//COMPAKT      EXEC    PGM=FDRABR, REGI ON=1124K
//SYSPRI NT     DD      SYSOUT=*
//SYSPRI N1     DD      SYSOUT=*
//SYSMAP1       DD      SYSOUT=*
//TAPE1         DD      DSN=FDR1, DI SP=(, KEEP), UNI T=TAPE
//DI SK1        DD      UNI T=3390, VOL=SER=PAY001, DI SP=SHR
//DI SK22       DD      UNI T=3380, VOL=SER=PAY101, DI SP=SHR
//CPKWORK       DD      UNI T=SYSDA, SPACE=(CYL, (1, 1))
//CPI N22       DD      *
                CPK      PORLSE=ALL
                S        DSG=PAYROLL, EXTENTS=KEEP
//SYSI N        DD      *
                DUMP     TYPE=FDR, COMPAKT, DSNENQ=USE
```

NOTE: With Version 5.2 Level 30, INNOVATION recommends that you remove COMPAKTOR from ABR backups and instead set up a separate FASTCPK job to run immediately after the full-volume backups. FASTCPK will run considerably faster than COMPAKTion-from-backup since no tape manipulation is required.

See [Section 40.26](#) "Recommendations for COMPAKTOR Use" for more details.

**INCREMENTAL  
BACKUP ALL  
ONLINE  
VOLUMES**

A compressed incremental backup of all online disk volumes is done to two tape drives. Two disk volumes will be processed concurrently, creating multiple backup data sets on the tapes (one per disk volume). All data sets on the disks which have been updated since the last ABR full-volume or incremental backup of that volume will be selected. However, all data sets with the text "PAYROLL" anywhere in their name will be backed up regardless of their update status. All data sets selected will be printed in ABR VTOC format. The ABRBKDQ points to the ABR backup dump remote queue data set; if present, any queued requests for backup will be processed. On SMS-managed volumes, the SMS management class attributes will be used to determine if data sets should be excluded.

```
//BACKUP        EXEC    PGM=FDRABR, REGI ON=4196K
//SYSPRI NT     DD      SYSOUT=*
//SYSPRI N1     DD      SYSOUT=*
//SYSPRI N2     DD      SYSOUT=*
//SYSUDUMP      DD      SYSOUT=*
//TAPE1         DD      NI T=3480, DSN=FDR1, DI SP=(, KEEP), VOL=(, , , 255)
//TAPE2         DD      UNI T=3480, DSN=FDR2, DI SP=(, KEEP), VOL=(, , , 255)
//SYSI N        DD      *
                DUMP     TYPE=ABR, ONLI NE, COMPRESS=ALL, PRI NT=ABR, SMSMANAGE=YES
                SELECT   DSN=**PAYROLL**
//ABRBKDQ       DD      DSN=FDRABR. ABRBKDQ. DATA, DI SP=SHR
```

CONTINUED . . .

## 50.12 CONTINUED . . .

**BACKUP ONLY  
SELECTED  
DATA SETS**

Do a manual backup (TYPE=DSF) of certain data sets using 3480/3490 IDRC. The combination of ONLVOL and CATDSN causes only the volumes on which those data sets are cataloged to be processed. Using catalog data set name filtering ([See Section 52.16](#)), all ISPF data sets for “USERnn” and the current generation of any “GLEDGER” GDGs will be dumped.

Even though this is a TYPE=DSF backup, the backup files created will be part of the ABR backup subsystem. They will be assigned a cycle number in the current generation of the volumes involved, and will be required if an ABR full-volume restore is required. An ABR full-volume backup may be forced. The ABR Application Backup ([Section 52.08](#)) may be a better technique for dumping selected data sets.

```
//DSF          EXEC   PGM=FDRABR, REGI ON=1124K
//SYSPRI NT    DD     SYSOUT=*
//SYSPRI N1    DD     SYSOUT=*
//ABRMAP       DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TAPE1        DD     DSN=FDR, DI SP=(, KEEP), UNI T=CART, DCB=TRTCH=COMP
//SYSI N       DD     *
                DUMP   TYPE=DSF, ONLVOL
                SELECT CATDSN=USER++. **I SPF**
                SELECT CATDSN=GLEDGER. **(O)
```

**AUTOMATIC  
INCREMENTAL  
OR FULL  
VOLUME  
BACKUP**

Do an incremental backup of all updated data sets on all online disk volumes (same as DUMP TYPE=ABR), except that ABR will force a full-volume dump for any selected volume if the number of incremental backups in the current generation exceeds the limit specified for CYCLE in the ABR model DSCB. TAPE1 and TAPE2 cause two disks to be dumped concurrently, and TAPE11 and TAPE22 cause duplicate backups to be created. Incremental and full-volume backups will be mixed on the same set of tapes.

TYPE=AUTO can be used when you do not have a special time to do full-volume backups (such as weekends), but prefer to do full-volume dumps of certain volumes each night and incremental backups of the rest of the volumes. Once the cycle counts of the volumes have been synchronized so that only a selected subset of your volumes will exceed their count each night, the process is automatic. If you do prefer to do full-volume backups on weekends or another special time, use separate jobs with TYPE=FDR and TYPE=ABR instead.

```
//BACKUP       EXEC   PGM=FDRABR, REGI ON=2248K
//SYSPRI NT    DD     SYSOUT=*
//SYSPRI N1    DD     SYSOUT=*
//SYSPRI N2    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TAPE1        DD     UNI T=(TAPE, 2), DSN=FDR1, DI SP=(, KEEP), VOL=(, , 255)
//TAPE11       DD     UNI T=(TAPE, 2), DSN=FDR11, DI SP=(, KEEP), VOL=(, , 255)
//TAPE2        DD     UNI T=(TAPE, 2), DSN=FDR2, DI SP=(, KEEP), VOL=(, , 255)
//TAPE22       DD     UNI T=(TAPE, 2), DSN=FDR22, DI SP=(, KEEP), VOL=(, , 255)
//SYSI N       DD     *
                DUMP   TYPE=AUTO, ONLI NE
```

CONTINUED . . .

## 50.12 CONTINUED . . .

**INCREMETAL  
BACKUP OF  
SMS  
VOLUMES**

Dump any updated data sets from all volumes in two SMS storage groups, creating compressed backups on one tape drive. Note that SMS volumes can also be selected by normal DISKxxxx DDs or VOL=/VOLG= operands. SMS management class attributes (See Section 52.50) may be used to exclude certain data sets from backup.

```
//BACKSMS      EXEC   PGM=FDRABR,REGION=2148K
//SYSPRINT     DD     SYSOUT=*
//SYSPRIN1     DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//TAPE1        DD     DSN=FDRSMS,UNIT=TAPE,DISP=(,KEEP),VOL=(,,,99)
//SYSIN        DD     *
                DUMP    TYPE=ABR,COMPRESS=ALL,SMSMANAGE=YES
                MOUNT   STORGRP=DBLARGE
                MOUNT   STORGRP=DBSMALL
```

**SIMULATE  
INCREMETAL  
BACKUP**

Simulate the incremental backup of all online volumes beginning with "TSO". ABR will report on all updated data sets which would be selected by a real DUMP TYPE=ABR.

```
//SIM          EXEC   PGM=FDRABR
//SYSPRINT     DD     SYSOUT=*
//SYSPRIN1     DD     SYSOUT=*
//ABRMAP       DD     SYSOUT=*
//TAPE1        DD     DUMMY
//SYSIN        DD     *
                SIM     TYPE=ABR
                MOUNT   VOLG=TSO
```

## 50.13 FDRABR DATA SET RESTORE EXAMPLES

**RESTORE  
SEVERAL  
DATA SETS  
FROM BACKUP**

Several data sets are to be restored from the ABR backup sub-system; the most current backup copy of each is selected. The TAPE1 DD allocates a tape drive, using a dummy DSN and volume serial; ABR will use it to mount the correct backup tape for each restore (but it must be the right type of tape drive for each tape required).

- Data set A.B.C is cataloged on some volume; its backup from that volume will be restored, replacing the existing contents of the data set.
- Data set ACCT.PAYROLL is restored the same way, except that its backup is restored from the duplicate backup, COPY2.
- Data Set PAYROLL.MASTER is not cataloged, so VOL=MASTER specifies both the volume from which the backup was taken and the volume to which it will be restored.
- Data Set SYS1.XYZ is to be restored as SYS2.XYZ, which will be allocated and cataloged on one of the online volumes starting with SYS.

```
//RESTORE      EXEC   PGM=FDRABR, REGI ON=1024K
//SYSPRI NT    DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//TAPE1        DD      DSN=FDR, VOL=SER=FDR,
//              UNI T=( TAPE, , DEFER) , DI SP=( OLD, KEEP)
//SYSI N       DD      *
                RESTORE TYPE=ABR
                SELECT  DSN=A. B. C
                SELECT  DSN=PAYROLL. MASTER, VOL=MASTER
                S        DSN=ACCT. PAYROLL, COPY=2
                S        DSN=SYS1. XYZ, NEWI =SYS2, NVOL=SYS*
```

**RESTORE  
SEVERAL  
DATA SETS  
WITH  
DYNTAPE**

Several data sets are to be restored from the backup sub-system. They may be on a mixture of backup device types, so DYNTAPE is used to dynamically allocate the backup files as required. One data set will have its latest backup restored, the other will restore from a specific ABR generation and cycle of the volume it is currently cataloged to. In both cases, the data sets will be restored to the volume they are cataloged to, overlaying their existing contents.

```
//RESTORE      EXEC   PGM=FDRABR, REGI ON=1M
//SYSPRI NT    DD      SYSOUT=*
//SYSUDUMP     DD      SYSOUT=*
//SYSI N       DD      *
                RESTORE TYPE=ABR, DYNTAPE
                SELECT  DSN=USER. FI LE1
                S        DSN=USER. FI LE2, GEN=5, CYCLE=2
```

**PROCESS THE  
ABR RESTORE  
REMOTE  
QUEUE**

Users have added requests for restore from backup to the ABR backup restore remote queue file. This JCL can be used to process those requests. The SYSIN file must contain a RESTORE TYPE=ABR statement. The ABRREST DD points to the remote queue file. ABR will ENQ on the remote queue, read the queued requests (if any), clear the queue, and immediately release it so that users are free to add new requests. Then it will process the requests, dynamically allocating the backup files as required. TSO users will receive messages on the success or failure of their request. If this queue is in use, this job should probably be run several times a day.

```
//REMOEB      EXEC   PGM=FDRABR, REGI ON=1024K
//SYSPRI NT    DD      SYSOUT=*
//SYSI N       DD      *
                RESTORE TYPE=ABR, DYNTAPE
//ABRREST      DD      DSN=FDRABR. ABRREST. USER, DI SP=SHR
```

CONTINUED . . .

## 50.13 CONTINUED . . .

**SIMULATE  
RESTORE  
FROM BACKUP**

A restore of selected data sets from backup is simulated by ABR, identifying the backup volumes required. This might be used to pre-pull required tapes from the library.

```
//SI M      EXEC   PGM=FDRABR, REGI ON=1024K
//SYSPRI NT  DD     SYSOUT=*
//TAPE1      DD     DUMMY
//SYSI N     DD     *
           SI MREST TYPE=ABR
           SELECT   DSN=USERA. FI LE1
           SELECT   DSN=USERA. FI LE2
```

**RESTORE  
FROM PRIOR  
BACKUP**

A data set is to be restored, not from its most recent backup, but from an earlier backup. OLDBACKUP=2 says to restore from the third most recent backup (0 is the most recent). OLDBACKUP can be used only if the OLDBACKUP option is enabled for the volume from which this data set was dumped. The PRINT BACKUP command of FDRABRP ([See Section 53.11](#)) can be used to display the backups of a data set and the dates they were taken.

```
//OLDBACK    EXEC   PGM=FDRABR, REGI ON=1024K
//SYSPRI NT  DD     SYSOUT=*
//SYSUDUMP   DD     SYSOUT=*
//SYSI N     DD     *
           RESTORE  TYPE=ABR, DYNTAPE
           SELECT   DSN=USER. DATA, OLDBACKUP=2
```

**RESTORE  
MULTI-  
VOLUME  
DATA SETS**

VSAM and non-VSAM multi-volume data sets must be restored to the same number of volumes they were dumped from. There are no special procedures for restoring a multi-volume non-VSAM data set other than ensuring that ABR has sufficient volumes to allocate it on. When restoring to the data set's original volumes, this is automatic. When restoring to new volumes, the NVOL= parameter must specify enough volumes. The new volumes can also be provided by the ABR RESTORE ALLOCATION LIST.

```
//MULTI VOL  EXEC   PGM=FDRABR, REGI ON=2M
//SYSPRI NT  DD     SYSOUT=*
//SYSUDUMP   DD     SYSOUT=*
//SYSI N     DD     *
           RESTORE  TYPE=ABR, DYNTAPE
           S        DSN=USER11. MULTI . VOL
           S        DSN=USER22. MULTI . VOL, NVOL=( PRODO1, PRODO2, PRODO3)
           S        DSN=USER33. MULTI . VOL, NVOL=PROD*
```

[See Section 52.11](#) for considerations for restoring multi-volume ICF VSAM clusters.

**50.14 FDRABR SMS DEVICE RESTORE EXAMPLES**

There are no special considerations when SMS-managed data sets are restored in place, on top of their existing allocations; ABR just replaces their contents. When any data set being restored by ABR must be allocated on a system with SMS active, the SMS ACS routines will be invoked to decide if it is to be SMS-managed, to assign SMS classes, and to decide which volume it is to be placed on.

Any of the data sets in the examples in preceding [section 50.13](#) could have been SMS-managed. If they needed to be allocated, ABR would have passed their previous SMS classes (if any) to the ACS routines, which could accept, reject or override them. If an SMS storage class is assigned to a data set, SMS will select a storage group and a volume for the allocation. The following examples show how to influence or override the SMS allocation.

 **OVERRIDE  
SMS CLASSES**

Restore a data set from the backup subsystem and request that the data set be SMS-managed; the original data set might be SMS-managed or not, but it is not currently cataloged; VOL= specifies the volume it was originally dumped from. The values specified for STORCLAS= and MGMTCLAS= will be passed to the SMS ACS storage and management class routines, which may override them. If SMS assigns a storage class, SMS will then select a storage group and a volume. If SMS assigns a null storage group (non-SMS-managed) to the data set, it will be restored to the volume from which it was dumped (unless that volume was SMS-managed, since a non-SMS data set cannot be restored to a SMS volume).

```
//RESTSMS      EXEC   PGM=FDRABR, REGI ON=1024K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//SYSI N        DD     *
                RESTORE TYPE=ABR, DYNTAPE
                SELECT  DSN=PROD. MASTER. FI LE, DATACLAS=MASTER,
                        MGMTCLAS=PERM, STORCLAS=PROD2, VOL=PROD01
```

 **RESTORE TO  
NON-SMS  
VOLUME**

Restore a data set from the backup subsystem and request that the data set be non-SMS; the original data set might be SMS-managed or not. It does not exist on disk but is recorded in the ABR scratch catalog. NULLSTORCLAS specifies that a null value will be passed to the SMS ACS storage class routine, which may override it. If SMS honors the null storage group, it will be restored as non-SMS on the volume TSO123; no SMS classes will be associated with it. If SMS assigns a storage class, SMS will then select a storage group and a volume.

```
//RESTSMS      EXEC   PGM=FDRABR, REGI ON=1024K
//SYSPRI NT     DD     SYSOUT=*
//SYSUDUMP      DD     SYSOUT=*
//SYSI N        DD     *
                RESTORE TYPE=ABR, RECAT, DYNTAPE
                SELECT  DSN=USER01. I SPF. I SPPROF, NULLSTORCLAS, NVOL=TSO123
/*
```



## 50.15 FDRABR FULL VOLUME RESTORE EXAMPLES

**FULL-VOLUME  
RESTORE  
FROM  
CURRENT  
BACKUP**

Two disk volumes are to be completely restored from ABR full-volume and incremental backups, beginning with the most recent incremental backup:

- \* PACK01 is to be restored back on top of itself. Its ABR model DSCB contains the most recent generation and cycle created.
- \* PACK02 has been destroyed, so its backup is to be restored onto a spare volume (SCR123). Since PACK02 is not online, ABR will search the ABR catalog for the most recent generation/cycle.

ABR will begin with the most recent incremental for each volume, and work back through the incrementals to the full-volume backup. The two volumes will be restored one at a time, in the order of the SELECT statements.

```
//RESTFULL EXEC PGM=FDRABR, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//DI SK1 DD UNI T=3390, VOL=SER=PACK01, DI SP=OLD
//DI SKX DD UNI T=3380, VOL=SER=SCR123, DI SP=OLD
//SYSI N DD *
        RESTORE TYPE=FDR, CPYVOLI D=YES, DYNTAPE
        SELECT VOL=PACK01
        SELECT VOL=PACK02, NVOL=SCR123
```

**FULL-VOLUME  
RESTORE OF  
FULL-VOLUME  
BACKUP ONLY**

A disk volume is to be recreated using only the most recent full-volume backup recorded in the ABR catalog. The original volume SYSRES is being restored to a scratch volume SCR001. Since it will be relabeled back to SYSRES at a later time, VOLRESET=NO prevents ABR from renaming the ABR model or the indexed VTOC.

This should be used when your installation has chosen to recover certain volumes using only the full-volume backup, rather than applying incremental backups. GEN=CURRENT forces ABR to locate the most recent generation in the catalog, while CYCLE=00 causes ABR to restore from only the full-volume backup which began that generation.

```
//RESTORE EXEC PGM=FDRABR, REGI ON=1024K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//DI SK1 DD UNI T=3380, VOL=SER=SCR001, DI SP=SHR
//SYSI N DD *
        RESTORE TYPE=FDR, VOLRESET=NO, DYNTAPE
        SELECT VOL=SYSRES, NVOL=SCR001, GEN=CURRENT, CYCLE=00
```

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**ABR**  
**AUTOMATIC BACKUP & RECOVERY**

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## 51.01 FDRABR ARCHIVE OVERVIEW

**ARCHIVE** ARCHIVING is the process of removing data sets from disk, and putting them instead onto a less expensive medium, such as tape or another disk in a highly compressed format. The ABR ARCHIVE sub-system frees up the space occupied by inactive data sets for more productive use of your disk volumes. Usually the selection of data sets for archiving is based on the last reference date that the Operating System sets in the DSCB each time the data set is opened, but other criteria can be used as well.

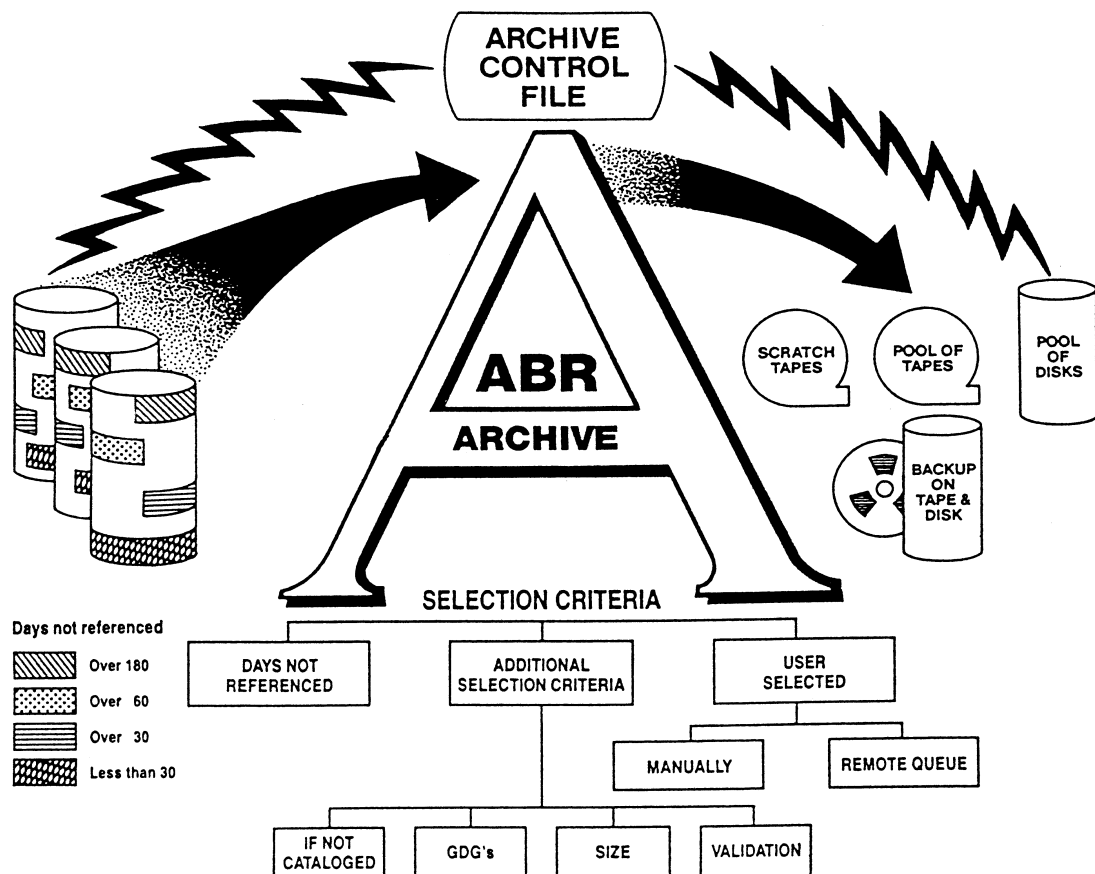
The rules for selecting data sets for ARCHIVING are defined through ABR control cards. The rules can be specified by disk volume serial, by data set name, or a combination of both.

In a system with SMS (System Managed Storage) active, the rules can be specified through SMS constructs as well.

Data sets selected for archiving will be backed up (to tape or disk) by FDRDSF, and will be scratched from disk, freeing their tracks for the allocation of other data sets.

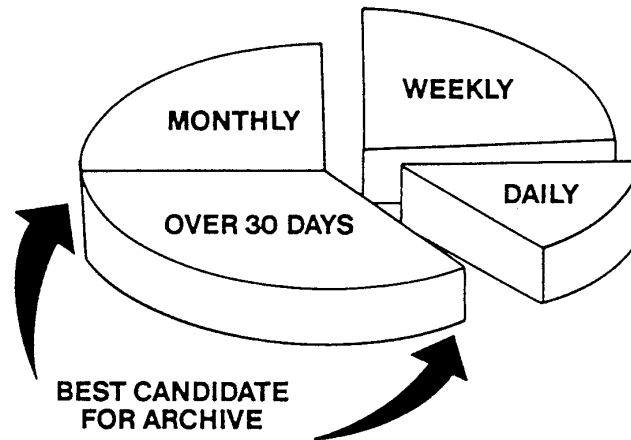
ABR records the archived data set in a data base called the Archive Control File. This file contains the archived data set name and characteristics, size of the data set, backup information, archive date and retention, etc. The Archive Control File is a BDAM (DSORG=DA) data set which must be preformatted by FDRARCH, the Archive Control File maintenance utility (See Section 55.10). There can be many Archive Control Files, for different purposes.

Unlike incremental backup, ARCHIVING does not depend on the ABR catalog to locate the backups of ARCHIVED data sets. However, some of the ARCHIVE backup files will be cataloged, in case you are using tape management catalog control retention. The first file created will be cataloged, as well as any file which crosses onto a second tape volume. All backup files on disk are cataloged.



CONTINUED . . .

## 51.01 CONTINUED . . .

**DISK VOLUME USAGE  
BY DATE LAST REFERENCED****ARCHIVE  
CRITERIA**

The most common criteria for selecting data sets for archiving is the last reference date, set in its DSCB by the operating system whenever a data set is opened for input or output. Based on the last reference date, data sets usually fall into one of four categories of usage: daily, weekly, monthly or inactive.

**DAILY** usage — data sets which are referenced at least once in three days should never be archived.

**WEEKLY** usage — data sets which are referenced about once a week should not be archived unless the installation has a critical need for DASD space.

**MONTHLY** usage — data sets which are referenced once a month may be a candidate for archive. The installation must balance the cost and time of the recall versus the space saved from the archive. The size of the data set may be a factor; large data sets may be archived more quickly than smaller ones.

**INACTIVE** data sets — data sets which have not been referenced in over 30 days usually are considered to be inactive. These data sets should be archived in most installations.

You can also select data sets for archiving if they are not cataloged, if they have passed their expiration date, or if they do not meet established naming conventions. For GDGs (Generation Data Groups) you can choose to keep a specified number of generations on disk and archive the rest.

Archive Criteria can be specified globally, or separate criteria can be specified for a given disk volume (or set of volumes) or a given set of data sets, or both. Global criteria can be specified for data sets which do not have their own criteria specified.

**PERIODIC  
ARCHIVE JOB**

Once the ARCHIVE criteria for the installation has been established, an ABR batch job should be run periodically to archive the data sets meeting the criteria. How frequently the archive job is run is a local decision, depending mainly on the need to maintain an adequate amount of free space on disk volumes. Typically it is run once a week. The backups created are usually retained for a year (the default) or more.

INNOVATION recommends that the duplicate backup option (TAPExx) be used for safety since this is the only copy of an archived data set. ABR reads the data from the disk only once, making two copies at the same time.

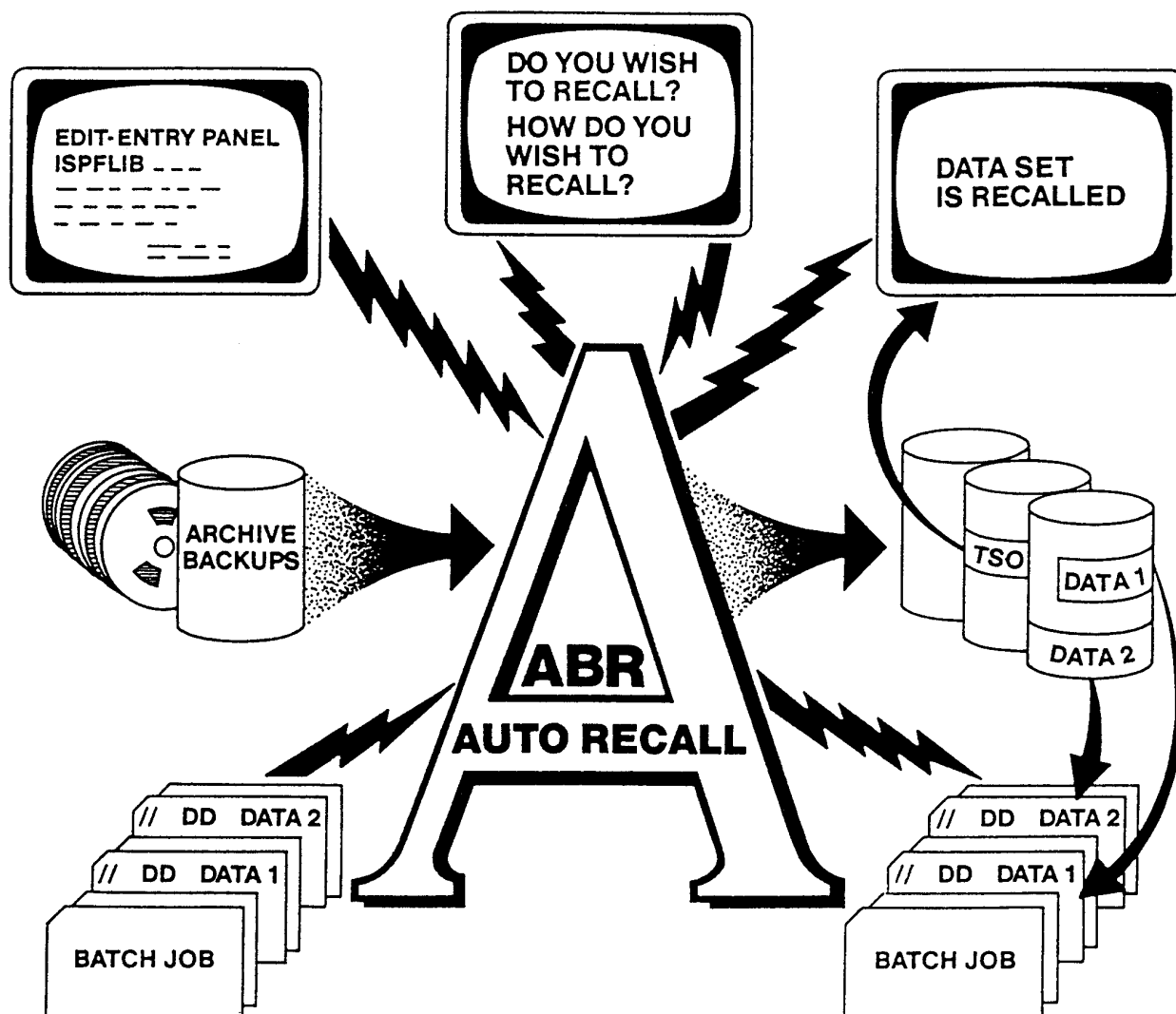
CONTINUED . . .

## ARCHIVE TO DISK

As an alternative to creating two backup copies on tape, ABR can create one copy of the backup on disk and one on tape. If a relatively high rate of recall is expected from BATCH or TSO users, it is recommended that the first copy of the archive backup be created on disk and retained for a short period of time (15-60 days). The tape copy can have a longer retention (usually a year or more). If the disk backup has expired, ABR will automatically recall the data set from the tape backup.

The backup on disk will usually take less space on disk than the original data sets (especially if the compress option is used). ABR can recall ARCHIVED data sets from a backup on disk without operator intervention.

Since the disk space available for archive backups is usually limited, a simple procedure is available to scratch expired backups on disk volumes. Since this would leave only one copy of the backup, you may wish to copy the disk backup to tape when it expires using the `FDRTCOPY` or `FDRTSEL` programs ([See Section 10.10](#)), which will update the Archive Control file to reflect that the first copy is now on tape.



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## 51.01 CONTINUED . . .

**ARCHIVE  
RESTORE**

ARCHIVED data sets can be restored by an ABR batch job using simple control statements or by the ABR TSO/ISPF panels. ABR will scan the Archive Control File for the data set to be restored, allocate the required disk or tape volume and do a data set restore. Like DSF, ABR can restore to the original disk volume or to alternate volumes specified by the user or by the ABR RESTORE ALLOCATION LIST. The restore process is described in [Section 52.04](#).

In addition, ABR can automatically recall ARCHIVED data sets which are referenced by a BATCH job or TSO session. The automatic recall of archived data sets is accomplished by installing two operating system exits (CATALOG LOCATE exit and DATA SET NOT FOUND exit) and by specifying RECALL when the data set is archived.

The CATALOG LOCATE exit ([See Section 52.20](#)) invokes an automatic Recall of a data set at Job Scheduler time. If a JCL statement is found referencing an ARCHIVED data set, ABR will restore the data set prior to the execution of the program. If more than one data set is to be restored from the same backup file, ABR will combine the restores in one execution.

The CATALOG LOCATE exit will also recall ARCHIVED data sets for TSO users. If a TSO user allocates an archived data set (ex: ALLOC, EDIT, BROWSE, etc.), ABR will inform the user that the data set was archived. The user is asked if and how the data set is to be restored (foreground, background or remote queue). ABR can be set to suppress any or all of the inquiries to the user, taking instead a default value (ex: always restore in background).

The DATA SET NOT FOUND exit recalls data sets at OPEN time if they were not referenced through the catalog.

**ARCHIVE  
CONTROL FILE**

ABR supports an unlimited number of Archive Control Files. Separate Archive Control Files can be used to record the archives of data sets for special purposes (such as the Application Backup described later). Most installations use one main Archive Control File since only one such file can be used for the automatic recall of archived data sets; the name of this file is specified in the ABR Global Options Table.

The Archive Control File requires periodic maintenance. Entries for archived data sets are added to the end of the file, so it will just continue to grow without maintenance. The expiration date of each copy of an archived data set is recorded in its Archive Control File entry; a maintenance run must be made to purge entries when both of its copies are expired. You can also purge entries that are flagged as having been restored, and you can mark entries for deletion (if, for example, the original data set is no longer cataloged).

All of these maintenance functions (and others) are done by FDRARCH, the Archive Control File maintenance utility, described in [Section 55.10](#).

**SUPER-  
SCRATCH**

The SUPERSCRATCH facility is used to scratch and uncatalog data sets without first taking a backup. These data sets will not be recorded in the Archive Control File. Most of the ARCHIVE selection criteria are available to SUPERSCRATCH.

SUPERSCRATCH can be used to clean up work volumes, or to enforce naming or catalog conventions when no backup of data sets violating the rules is desired. SUPERSCRATCH can also be used to delete expired ABR backup files on disk.

**SIMULATION**

Simulations of the ARCHIVE or SUPERSCRATCH can be performed before the actual ARCHIVE operation. ABR will display the data sets that would be selected in ABR PRINT VTOC Format.

CONTINUED . . .



## 51.01 CONTINUED . . .

**POOLDISK** You can specify that ABR is to backup the ARCHIVED data sets to a pool of disks. ABR will automatically allocate the backup data sets volumes in the pool with the most available space. A duplicate backup copy can be created on tape at the same time.

**ICF VSAM SUPPORT** ABR can ARCHIVE and SUPERSCRATCH ICF VSAM clusters using the last reference date or control statement criteria. ABR will only use the last reference date stored in the data component of the base cluster. If an ICF VSAM cluster is selected, ABR will backup (except on SUPERSCRATCH) all of its associated components on this volume. The VVR information stored in the VVDS is also stored on the backup file. [See Section 52.11](#) for more details.

NOTE: The user must enable the option ICFSU60 in the FDR/ABR Global Option Table ([See Section 91 or 92](#)) to allow ABR to select ICF VSAM files based on last reference date (ADAYS or ADATE). The ICFSU60 option is assumed if you are running DFP V3 or above.

**PROTECT LIST** The user can set up PROTECT LISTS to exclude data sets from ARCHIVE, SUPERSCRATCH or RESTORE operations. The PROTECT LISTS are established by using program FDRZAPOP ([Section 91](#)) or the ABR TSO/ISPF dialogs.

**DATA COMPRESSION** ABR can be instructed to compress the data on the backup file for archived data sets. This option will decrease the number of bytes transferred to the backup file. The compressed file will usually be 50% smaller than an uncompressed file. This option is especially useful if the ARCHIVE backup is on disk.

**APPLICATION BACKUP & RECOVERY** [See Section 51.20](#) on how to use ABR for point-in-time Application Backups.

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**51.02 FDRABR ARCHIVE DUMP JOB CONTROL REQUIREMENT**

The following Job Control Statements are required to perform ARCHIVE dump functions.

**JOB  
STATEMENT**

The JOB statement is user-specified and depends upon installation standards.

**EXEC  
STATEMENT**

Must specify the name of the program to be executed-FDRABR. The basic region size is 1200K for FDRABR. The storage requirement is increased by 1024K for each additional TAPEX DD statement beyond the first. If the COMPRESS option is used, add 1024K per TAPEX DD. The PARM, if specified, is used by ABR as the first control statement. If the PARM contains a slash ("/") the data after the slash will be used as the second control statement.

**STEPLIB or  
JOBLIB DD  
STATEMENT**

If required, must specify the load module library in which ABR resides. The library must be AUTHORIZED.

**SYSPRINT DD  
STATEMENT**

Specifies the output message data set. This is a required DD statement. SYSPRINT usually specifies a SYSOUT data set.

**SYSPRINx DD  
STATEMENTS**

Specifies the secondary message data set for the DUMP operation. "x" must correspond to the "x" on each of the TAPEX DD statements. One SYSPRINx must be specified for each TAPEX DD statement. Required for all DUMP functions. Usually a SYSOUT data set. If not SYSOUT, this DD must specify a disposition of MOD.

**ABRMAP DD  
STATEMENT**

Specifies the output report data set if SIM or PRINT=ABR is specified. This DD is optional. If not specified the SIM report will be printed on the SYSPRINx DD statement. Usually a SYSOUT data set. If not SYSOUT, this DD must specify a disposition of MOD.

**SYSDUMP DD  
STATEMENT**

Specifies the ABEND dump data set. Although not required, we strongly urge you to always include this DD statement so we can help you diagnose your error conditions. Usually a SYSOUT data set.

**ARCHIVE DD  
STATEMENT**

Specifies the ABR Archive Control File. This DD is required for DUMP TYPE=ARC unless DYNARC is specified. The standard name for this data set is FDRABR.ARCHIVE. ABR uses this data set as an inventory and catalog file for all data sets that have been archived from disk volumes. Specify DISP=SHR since ABR internally serializes access. On SIMULATION or TYPE=SCR operations this DD is not required.

**DISKxxxx DD  
STATEMENTS**

Optionally specifies disk volumes to be processed by ABR. "xxxx" is 1 to 4 valid alphanumeric characters (0-9, A-Z); any combination may be used. ABR will build a list of the volume serials from all of the DISKxxxx DDs found in the ABR step JCL; the volumes will be processed in the order that the DISKxxxx DDs are found.

If the ONLINE operand is specified, all online disk volumes will be processed automatically, so DISKxxxx DDs are not normally required. If the ONLVOL operand is specified, any volumes specified by SELECT statements (VOL= or VOLG= operands, or selected from the catalog by the CATDSN= operand) will be automatically processed. These volumes will be added to the list of volumes specified by DISKxxxx DDs (if any). However, both ONLINE and ONLVOL will select volumes in the order of their device addresses (UCB address order), so you may still want to use DISKxxxx DDs to specify the order of processing for certain volumes.

Normally only one volume serial number is specified per DD statement, but up to 255 volume serials may be given (they must all be the same type and density, e.g., all 3380-K).

A maximum of 256 DISK volumes can be specified in one execution of ABR. If more disk volumes are required, MAXDD= must be specified.

EXAMPLE:           //DI SK1       DD   UNI T=SYSDA, VOL=SER=vvvvvvv, DI SP=OLD  
                  //DI SKABC   DD   UNI T=3390, DI SP=OLD,  
                  //               VOL=SER=(D3390A, D3390B, D3390C)

NOTE: If ABR encounters multiple DISKxxxx DD statements pointing to the same disk volume serial, ABR will process the volume once using the first DDNAME encountered. DISKONLx is a reserved DDNAME, used by ABR for ONLINE processing. DISKxxxx must not specify UNIT=AFF or UNIT=(xxxx,,DEFER).

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## 51.02 CONTINUED . . .

**TAPEx DD  
STATEMENT(s)**

Specifies the backup devices (tape or disk) to be used by ABR. x is any alphanumeric character (0-9, A-Z). A maximum of 10 such TAPEx DDs may be present in the ABR step JCL. ABR will start an internal dump subtask for each TAPEx DD present, each subtask processing one disk volume from ABR's list of disk volumes. If only one TAPEx is provided, ABR will process disk volumes one at a time; if multiple TAPEx DDs are present, ABR will process up to 10 disks in parallel (however, region requirements may limit the number of concurrent subtasks; see the EXEC statement on page 606). TAPEx DDs that specify DUMMY or DSN=NULLFILE will be ignored except for simulation.

SIMULATION/SUPERSCRATCH: If SIM and/or TYPE=SCR is specified, you must specify:

```
//TAPE1 DD DUMMY
```

TAPE OUTPUT: If outputting to tape or cartridge, specify:

DSN=— a dsname is required by MVS, but it will be overridden by ABR at OPEN time, so any non-temporary name is acceptable. However, MVS will do an exclusive ENQ on this name so each ABR job should use unique names. [See Section 52.05](#) for the dsnames actually used at ABR.

UNIT=— specify a generic (e.g., 3490) or esoteric (e.g., CART) name to allocate the type of tape drive desired. If you have sufficient tape drives available, specifying a unit count of 2 (e.g., UNIT=(3490,2)) may reduce elapsed time.

DISP=(NEW,KEEP)— do not specify CATLG since ABR handles cataloging of output files internally.

VOL=— specify a volume count (e.g., VOL=(,,255)) to prevent ABR from abending if more than 5 tape volumes are required. If no volume serials are specified, ABR will call for scratch tapes; this is recommended; however, you may specify up to 255 tape volume serials.

LABEL=— you may want to specify RETPD=nnn or EXPTD=yyddd to specify the expiration date of the archive backups (retention period may also be specified on the DUMP statement). ABR will record the expiration date of this archive copy in the Archive Control File for each data set archived and use it to manage recall and deletion of the data sets. If you have a tape management system it may honor the expiration specified ([See Sections 52.06 and 52.12 for details](#)).

If multiple disk volumes are dumped to a given TAPEx DD, ABR will create multiple files on the tape (or tape aggregate if more than one tape volume is used), one file for each disk volume.

```
EXAMPLE: //TAPE1 DD DSN=ARC1, UNIT=3490, DISP=(NEW, KEEP),
          // LABEL=RETPD=720
```

**WARNING: If I/O errors occur on the output tapes, do not allow MVS to SWAP the tape to another unit (reply NO to any IFG500D messages).**

LAST TAPE OPTION: The LAST TAPE option of ABR allows you to add backup files to a tape or tape aggregate created by a previous ABR step (even if that step is in another job and even if it was run on a previous day). This option is controlled entirely through JCL. To request LAST TAPE, the TAPEx DD is similar to that described above except that you specify:

DSN=FDRABR.LASTAPE.xxxxxxxx — the last index is 1 to 8 characters of your choice; you may have multiple LASTAPE files for various purposes. This name will be cataloged to record the tape volume serial and file number where ABR is to start its output.

DISP=(MOD,KEEP) — this tells ABR to locate the FDRABR.LASTAPE.xxxxxxxx file in the catalog, verify that the file exists on the output tape, and begin outputting to the tape at that point. If the name is not cataloged, ABR will call for a scratch tape and begin at file 1. Also, if you specify NEW instead of MOD, ABR will ignore the LASTAPE file and use scratch tapes (but it will still record the LASTAPE for future use).

VOL= — volume serials should not be specified.

```
EXAMPLE: //TAPE1 DD DSN=FDRABR.LASTAPE.ARC1,
          // UNIT=3490, DISP=(NEW, KEEP)
```

DISK OUTPUT: You may request that ABR create backup files on disk. This is often used for COPY1 of ARCHIVE backups (with a short retention such as 15 to 60 days so that recalls requested shortly after a data set is ARCHIVED can be completed without a tape mount). The TAPEx DD simply points to one or more disk volumes; ABR internally handles naming, allocating and cataloging the required backup files. [See Section 52.05](#) for the file names that ABR will create.

```
EXAMPLE: //TAPE1 DD UNIT=3390, DISP=OLD,
          // VOL=SER=(ARCO01, ARCO02, ARCO03, ARCO04, . . . )
```

CONTINUED . . .

## 51.02 CONTINUED . . .

**TAPEx DD  
STATEMENTS  
(Continued)**

ABR will start allocating backups on the first volser provided and will move down the list as the volumes fill up. Multi-volume backup files may be created. By default, ABR allocates its backup files with;

SPACE=( TRK, ( 100, 100) , RLSE, ALX)

The ALX parm requests that the 5 largest extents on the volume that are at least 100 tracks large be allocated to the data set (so that it will be a minimum of 100 tracks and a maximum of the size of the disk volume), and RLSE requests that any unused space be released at the end of the backup. You may override this allocation by specifying the SPACE= parm on the TAPEx DD; be sure to specify the RLSE parm and the ALX parm is recommended.

Do not specify a DSN= parm unless the POOLDISK option is used. You may specify LABEL=RETPD=nnnn or LABEL=EXPDT=yyddd to specify the expiration date of the backups; this is recorded in the Archive Control File ([See Section 52.06](#)).

POOLDISK OPTION: When outputting to disk, you may use the ABR POOLDISK option, allowing ABR to manage a pool of disks used for ABR backup data sets. Like LASTAPE, this is invoked through JCL options by specifying DSN=FDRABR.POOLDISK.xxxxxxxx on the TAPEx DD, where xxxxxxxx is any name of your choice (allowing you to have multiple pools for various purposes). Otherwise the JCL is the same as just described for disk output.

EXAMPLE:       //TAPE1   DD    DSN=FDRABR. POOLDI SK. ARCHI VE1,  
                  //           UNI T=3390, DI SP=OLD, LABEL=RETPD=30,  
                  //           VOL=SER=( ARCO01, ARCO02, ARCO03, ARCO04, . . . )

Alternately you may catalog the POOLDISK data set with IDCAMS or IEFBR14, pointing to the volumes in the pool; then the volume list may be updated at any time without modifying the ABR JCL.

EXAMPLE:       //TAPE1   DD    DSN=FDRABR. POOLDI SK. ARCHI VE1,  
                  //           DI SP=OLD, LABEL=RETPD=30

In every ABR run, ABR will sort the POOLDISK volume list by the amount of free space available on each volume so that the volumes with the most available space will be used first (if the POOLSORT=NO option is specified ABR will use the volumes in the order specified, but will remember from run to run which volumes it used last).

NOTE: When DISK is used as a backup medium, a duplicate copy (TAPExx) to a real tape unit should be specified. The retention of the backup on DISK should be for a short duration and the retention of the tape backup should be for as long as the ARCHIVED data sets are to be kept. The retention period is coded on the TAPE DD statements.

WARNING: Tapes created by ABR cannot be copied using normal copy programs. Use the INNOVATION provided program (FDRTCOPY) to copy ABR tapes.

**TAPExx DD  
STATEMENTS**

Specifies that ABR is to create a duplicate tape of the backup. xx must specify the same character twice with (xx) corresponding to the x of the TAPEx statement.

EXAMPLE:       //TAPE11   DD    DSN=FDR11, DI SP=( , KEEP) , UNI T=TAPE

will produce a tape which is the same as

                  //TAPE1   DD    DSN=FDR1, DI SP=( , KEEP) , UNI T=TAPE

NOTE: TAPExx may specify any of the options documented for TAPEx, such as LASTAPE.

**ABRARDQ DD  
STATEMENT**

Specifies the remote queue data set for ARCHIVE operations. This DD statement is optional. If specified, ABR will read the control statements contained within, if any, and append these statements to the SYSIN data set. The SYSIN data set must contain at least a DUMP/SIM TYPE=ARC command. After reading the control statements, ABR will reset the file to a null (empty) data set except on SIM. This DD statement is ignored on TYPE=SCR.

NOTE: The TSO/ISPF Panels or program FDRABRUT (Section 54) write to these remote queue data sets. DISP=SHR should be specified, since ABR internally reserves this data set.

CAUTION: This ABR execution must reference all of the volumes which contain the data sets specified in the remote queue. If the ABR PANEL was used to write to the remote queue, use the ONLVOL operand on the DUMP command.

**SYSIN DD  
STATEMENT**

Specifies the control statement data set. Required for all ABR functions. Usually an input stream or DD \* data set.

51.03 ARCHIVE DUMP or SCRATCH Command

DUMP D	TYPE=ARC SCR	,MIGRAT=YES NO
	,ALTINDEX=NO	,MGMTCLAS=(mgmtclas,..)
SIM	,ARCBACKUP=ABR DSF NO	,NOINIT
	,BUFNO=nn  <u>MAX</u>	,NOUNCAT
	,CATBYPERR	,ONLINE
	,COMPRESS=ALL COPY1 COPY2	,ONLVOL
	,DATA= <u>USED</u>  ALL	,POOLSORT=NO
	,DSNENQ= <u>NONE</u>  TEST USE HAVE	,PRINT=ABR
	,DYNARC	,RECALL=YES NO
	,ENQ= <u>ON</u>  OFF RESERVE	,RETPD=dddd
	,ENQERR=NO	,SCRATCH[=IBM]
	,ENQERR= <u>BYPASS</u>  PROCESS	,SCRATCH=CAT
	,EXPD=NONE	,SCRATCH=NO
	,VEXPD=NONE	,SELTERR=NO  <u>YES</u>
	,FORMAT=OLD  <u>NEW</u>  SPLIT	,SMSCOMMAND= <u>NO</u>  YES
	,ICFCORE=nnnnnn	,SMSCONSTRUCT= <u>YES</u>  NO
	,ICFSU60	,SMSEXPIRE= <u>NO</u>  YES PRT
	,LBPZERO=VALID  <u>INVALID</u>	,SMSMANAGE= <u>NO</u>  YES
	,MAXBTRKS=nnnnn	,SMSMINRET= <u>30</u>  nnnn
	,MAXCARDS=nnnnn	,SMSTHRESHOLD= <u>YES</u>  NO
	,MAXDD=nnnnn	,THRESHOLD= <u>NO</u>  HIGH LOW nnn
	,MAXERR=nnnnn	
	,MAXFILE=nnn	

GENERAL ARCHIVE  
SELECTION CRITERIA \*

,ADATE=yyddd  
,ADAYS=dddd  
  
,CRDAYS=dddd  
  
,EXPIRED  
  
,IFNOTCAT  
  
,MAXGDG=nnn  
  
,REMOTE  
  
,VALIDATE

\* NOTE:  
If a data set meets any  
one of these GENERAL  
ARCHIVE SELECTION  
CRITERIA, it will be  
ARCHIVED unless  
it is controlled by a  
SELECT/EXCLUDE  
statement.

CONTINUED . . .

51.03 CONTINUED . . .

**DUMP COMMAND** The DUMP Command activates the ARCHIVE (TYPE=ARC) or SUPERSCRATCH (TYPE=SCR) of data sets. Only one DUMP statement is allowed per execution of ABR.

**SIM COMMAND** If SIM is specified, ABR will perform the ARCHIVE or SCRATCH function in a simulation mode. The TAPEX DD statement must specify DD DUMMY. ABR will not perform the actual ARCHIVE or SCRATCH operation, only reporting the data sets which would be archived in the PRINT VTOC format. This allows various options to be tested without danger of archiving or scratching undesired data sets.

**ARCHIVE DUMP PROCEDURES** DUMP TYPE=ARC activates the ABR ARCHIVE facility. Based on ARCHIVE criteria operands ABR will back up and scratch data sets from a disk volume. These data sets will be recorded in the Archive Control File. At the completion of the ARCHIVE run, ABR will optionally backup the Archive Control File as the last file of the last backup tape used.

**SUPER-SCRATCH** DUMP TYPE=SCR activates the ABR superscratch facility. This command accepts the same criteria as archive. ABR will scratch and uncatalog any data sets selected without first taking a backup. These data sets will not be recorded in the Archive Control File or the ABR scratch catalog. The volume must be enabled for superscratch using program FDRABRM.

**OPERANDS TYPE=ARC** An ARCHIVE Function is requested. Any data set which matches the specifications on a control statement (SELECT, EXCLUDE, etc., [See Section 51.04](#)) will be controlled by that statement. Other data sets on the volumes processed by ABR will be archived if any GENERAL ARCHIVE SELECTION CRITERIA operands are specified on the DUMP statement; if they match ANY of those criteria they will be archived. If no GENERAL ARCHIVE SELECTION CRITERIA parameters are specified on the DUMP/SIM statement, then only data sets selected by SELECT statements will be archived. If SMSMANAGE=YES is specified, see [Section 52.50](#) for details on ARCHIVING by SMS management class attributes.  
(See Archive Rules in [Section 52](#) for a more detailed explanation).

**TYPE=SCR** Specifies that ABR is to scratch the data sets selected. No backup will be taken. All of the ARCHIVE criteria except for REMOTE apply. The data sets will also be uncataloged unless NOUNCAT is specified. If SMSMANAGE=YES is specified, see [Section 52.50](#) for details on scratching by SMS management class attributes.

**WARNING: THIS IS A VERY DANGEROUS COMMAND SINCE NO BACKUP IS TAKEN. A SIMULATION SHOULD BE RUN PRIOR TO THE ACTUAL SCRATCH RUN.**

**ADATE=** Any data set whose last reference date precedes this date will be archived. Date is specified in Julian format.

**ADAYS=** Any data set whose last reference date is at least this number of days in the past will be archived. The value specified will be subtracted from today's date. If the result is greater than the last referenced date, the data set will be archived. Leap year is not considered during date calculation.

NOTE: ADAYS and ADATE are mutually exclusive. One of the above must be specified to activate archiving based on the last reference date.

If you want to archive by last reference date, but only within a particular data set group, specify ADAYS on a SELECT Command, and do not specify ADATE or ADAYS on the DUMP Command.

VSAM NOTE: ABR will only check the last reference date stored in the data component for the base cluster on ICF VSAM files. The last reference date will only be checked if the ICFSU60 option is specified on the DUMP/SIM command or this option is enabled in the FDR/ABR global option table.

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## 51.03 CONTINUED . . .

**ALTINDEX=** **NO** – specifies that ABR will archive but not scratch any ICF clusters that have an associated alternate index, since ABR does not archive or restore PATH names for alternate indexes.

Default is that ABR will not test for alternate indexes.

**ARCBACKUP=** Specifies how ABR is to backup the ARCHIVE Control file at the completion of an ARCHIVE run.

**ABR** – specifies that an ABR backup of this data set is to be taken. This will increment the cycle and possibly the GEN (An FDR backup may be forced).

**DSF** – specifies that a DSF backup of this data set is to be taken. ABR will catalog this backup using the same name as the Archive Control File, except that the index level 'ARCHIVE' will be changed to 'ARCBKUP' for TAPEX and 'ARCBKU2' for TAPEXX (if duplicate backup). This cataloged name will only keep track of the most current backup of the Archive Control File. This option cannot be used if the Archive Control File has a non-standard name not containing an index level of 'ARCHIVE'. ARCBACKUP=DSF should not be used when archiving to disk since duplicate names will be created on the disk.

**NO** – specifies that the Archive Control File will not be dumped at the end of the ARCHIVE.

Default is ABR if the ARCHIVE is to tape; NO if the TAPEX backup is to DISK.

**BUFNO=** Specifies the ABR performance option.

**MAX** – specifies that ABR is to acquire enough buffers to retain a cylinder of data in storage at a time, and is to use an I/O technique involving the Read Multiple Count Key Data command or the Read Track command. This technique requires 1024K per concurrent backup without COMPRESS, or 2048K per concurrent backup with COMPRESS. The virtual storage for these buffers is located in the private area below 16 MB, and the real storage is located above 16 MB, if available. INNOVATION strongly recommends running with this technique for optimum performance.

**nn** – specifies the actual number of buffers to be acquired. This option may be requested if the installation does not have sufficient storage to support BUFNO=MAX. This option causes ABR to use a slower I/O technique than with BUFNO=MAX.

This option is ignored if backup is to disk.

Default is MAX unless overridden in the FDR/ABR global option table ([See Section 91 or 92](#)).

**CATBYPERR** Specifies that, if the CATDSN= operand is used on SELECT statements, any error messages caused by trying to access catalogs which are OS CVOLS, or which have OPEN errors, will be suppressed; those catalogs will simply be bypassed.

Default is that CVOL and OPEN errors will be reported.

**COMPRESS=** **ALL** – specifies that ABR is to compress the output data on the backup file for both copies (TAPEX and TAPEXX).

**COPY1** – specifies that only the data on the TAPEX DD statement will be compressed.

**COPY2** – specifies that only the data on the TAPEXX DD statement will be compressed.

Add 1024K to the ABR region for each TAPEX DD if compression is requested.

Default is that the backup files will not be compressed.

INNOVATION strongly recommends running with COMPRESS and BUFNO=MAX to substantially reduce tape usage and to reduce elapse time, if CPU time and storage are available.

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51.03 CONTINUED . . .

**CRDAYS=** Specifies that ABR is not to select any data set based on the GENERAL ARCHIVE SELECTION CRITERIA on the DUMP statement unless it was created at least n days ago.

Default is 2 days if IFNOTCAT was specified; else default is 0 days.

NOTE: CRDAYS on the DUMP command functions as an EXCLUDE facility for the GENERAL ARCHIVE SELECTION. If none of the other criteria is specified (ex: ADAYS, IFNOTCAT) CRDAYS will be ignored. If you wish to select data sets solely based on creation date specify CRDAYS on SELECT commands.

**DATA=** **ALL** – specifies that ABR will dump the entire data set on an incremental backup.  
**USED** – specifies that ABR is to dump only the used portion of PS or PO type data sets. On most volumes this will make the dump run faster, but at the risk of not backing up all of the data if data sets have invalid last block pointers.

If the data set has a last block pointer of zeros, which usually means it was never used, ABR will default to dumping the entire data set unless LBPZERO=VALID is specified. With LBPZERO=VALID, ABR will dump only the first track.

The default is USED.

**DSNENQ=** Specifies that ABR is to enqueue all of the data sets being archived. ABR will issue an exclusive enqueue with a major name of 'SYSDSN' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, ABR will issue a warning message for the data set. The data set will not be archived unless ENQERR=PROCESS is specified. ABR will not issue a condition code at the end of the job.

DSNENQ is independent of ENQ= which prevents new data sets from being allocated or old data sets from being scratched.

**TEST** – The data sets will only be tested to see if they are active at the time the dump starts. The data set will not be enqueued.

**USE** – The data sets will be enqueued for the duration of the DUMP. If not available, only a warning message is issued and the data set will not be enqueued.

**HAVE** – The data sets will be enqueued for the duration of the DUMP. If not available, ABR will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. IF WAIT is specified, ABR will wait for the data set to become available. The job could time out. If NOWAIT is specified, ABR will print a warning message for the data set and will not issue the enqueue. If RETRY is specified, ABR will attempt the enqueue again.

**NONE** – This is the default. No data set ENQ will be issued.

NOTE: If the data set is specified in a DD statement in the ABR job with DISP=SHR, ABR will change the scheduler enqueue for the data set to EXCLUSIVE (DISP=OLD) if the user specifies TEST, USE or HAVE. The operator cannot respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.

CAUTION: This option should not be used on shared DASD unless a cross-system enqueue facility is available and the SYSDSN QNAME is broadcast across systems. Without this capability, ABR can only determine what data sets are active on the system ABR is running on.

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## 51.03 CONTINUED . . .

<b>DYNARC</b>	<p>Specifies that ABR is to use the name for the Archive Control File that is saved in the FDR/ABR global option table. Default name is 'FDRABR.ARCHIVE'. ABR will store the entries archived in this control file. DYNARC should be specified if RECALL is used. ABR will allocate this file using dynamic allocation to DD ARCHIVE#.</p> <p>Default is that the user must supply an ARCHIVE DD statement pointing to the Archive Control File.</p>
<b>ENQ=</b>	<p><b>ON</b> – specifies that ABR is to perform an enqueue on the VTOC during the dump operation. This enqueue will prevent other tasks from allocating new data sets or scratching old data sets on the system ABR is running on.</p> <p><b>RESERVE</b> – specifies that ABR will issue a RESERVE on the volume being dumped. This command will lock out a shared DASD system from accessing the pack.</p> <p><b>OFF</b> – specifies that ABR will not enqueue the VTOC during the dump. ENQ=OFF must not be specified unless DSNENQ=USE or HAVE is also specified; otherwise the wrong data sets may be scratched.</p> <p>Default is ON.</p>
<b>ENQERR=</b>	<p><b>NO</b> – specifies that ABR will not set a condition code or abend at the end of the ABR execution if the DSNENQ= option is used and a data set is found to be active.</p> <p>Default is that ABR will issue a condition code or abend.</p>
<b>ENQERR=</b>	<p><b>BYPASS</b> – specifies that ABR is not to archive a data set if the DSNENQ= option is used and the data set is found to be active.</p> <p><b>PROCESS</b> – specifies that ABR is to archive a data set even if the DSNENQ= option found it to be active (a warning message will still be produced; the scratch may fail).</p> <p>Default is BYPASS.</p> <p>NOTE: both ENQERR=NO and ENQERR=BYPASS/PROCESS may be specified on the same DUMP statement.</p>
<b>EXPD=</b> <b>VEXPD=</b>	<p><b>NONE</b> – specifies that ABR will ignore the expiration date test for all data sets.</p> <p><b>VEXPD=NONE</b> applies only to VSAM files. For ICF VSAM clusters which are date protected, EXPD=NONE or VEXPD=NONE must be specified for ABR to scratch date protected VSAM clusters.</p> <p>Default is that ABR will check the expiration date of a data set being archived. If the data set has not expired, ABR will ask the operator for permission before archiving the data set. On VSAM files, ABR will not issue an operator message.</p>
<b>EXPIRED</b>	<p>Specifies that ABR is to archive data sets if their expiration date is less than or equal to today's date. ABR will not ARCHIVE data sets with an expiration date of zero unless selected by other criteria. The expiration date is not checked on VSAM files unless they are SMS-managed.</p>

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## 51.03 CONTINUED . . .

- FORMAT=** Specifies the format of the sequential backup file.  
**OLD** – specifies that ABR is to create the backup using the format prior to Ver 4.5. This option defaults to SPLIT on disks with a track size over 32K.  
**NEW** – specifies that ABR is to create the backup using a maximum of a 56K blocksize.  
**SPLIT** – specifies that ABR is to create the backup using a maximum blocksize of 32K. ABR will split the backup blocks into multiple records.  
 WARNING: If you use a normal copy program (ex: IEBGENER) on a new format tape you will not get any error messages, but the resulting tape will not be usable for a restore. Tapes in the new format must only be copied with the INNOVATION provided tape copy program (FDRTCOPY) or FATAR (Version 4 or higher). If FORMAT=OLD or SPLIT is specified, ABR will ignore the BUFNO option.  
 Default: NEW if backup on tape – SPLIT if backup is on disk.  
 Use of FORMAT=OLD or SPLIT will result in a large increase in elapsed time.
- ICFCORE=** Specifies that ABR is to increase the size of the table used to store the ICF VSAM cluster and component names. ABR needs to save all of the component names and their associated clusters which currently exist on the volume. nnnnnn is specified in bytes and must be large enough to contain all the VSAM names.  
 NOTE: Specifying ICFCORE= will increase the ABR memory requirement by the value specified. The default value imposes no additional memory requirement.  
 Default is 49152 bytes, which normally holds about 600 ICF VSAM components. If the input disk is a 3390, the default is 53248, which will hold about 650 components.
- ICFSU60** Specifies that ABR is to use the last reference date (using ADAYS or ADATE) for ICF VSAM clusters.  
 Default is that ABR will not ARCHIVE ICF VSAM files using ADAYS(ADATE), unless ICFSU60 was enabled in the FDR/ABR global option table. ICFSU60 is the default if you are running DFP Version 3 or above.
- IFNOTCAT** Specifies that ABR is to archive data sets which are not cataloged to the volume they reside on. If the catalog is not available or any other catalog error exists, ABR will not use this selection criterion. Also ABR will not archive this data set if it is less than 2 days old, unless overridden by using the CRDAYS= keyword. A time delay is necessary to avoid ARCHIVING active data sets which will be cataloged at the end of the step or job that is creating them. VSAM is always considered cataloged.  
 NOTE: IFNOTCAT can be very expensive to run if the system contains a large number of data sets.  
 Default is that the catalog is not checked.
- LBPZERO=** **VALID** – specifies that ABR is to consider PS data sets which are empty (last block pointer of zero) as containing one used track.  
**INVALID** – specifies that ABR will consider PS data sets which are empty as fully used.  
 WARNING: Care should be taken using this option since certain data sets may have the last block pointer as all zeroes and not be empty.  
 EX: SYS1.DUMP data sets.  
 Default is INVALID – the entire data set will be dumped.

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## 51.03 CONTINUED . . .

- MAXBTRKS=** If more than the specified number of disk tracks are selected for ARCHIVE from a given disk volume, ABR will make multiple passes on that disk, creating multiple archive backup files. This reduces the size of individual archive backups if a great deal of data is being archived, and will improve recall performance. The size of each backup will vary, since archived data sets will not be split among backup files. MAXBTRKS=65536 or more will disable this feature.  
Default is 4096 tracks.
- MAXCARDS=** Enables ABR to accept additional SELECT, PROFILE, PROTECT, EXCLUDE and MOUNT Commands during this execution.  
Default is 100 SELECT, PROFILE, PROTECT, EXCLUDE and MOUNT Commands.
- MAXDD=** Enables ABR to process more than 256 disk volumes in an ABR step.  
Default is 256 volumes, unless overridden by the MAXONLINE option in the FDR/ABR Global Option Table ([See Section 91 or 92](#)).
- MAXERR=** Specifies the number of tape or disk errors that are to be encountered by ABR prior to abending the DUMP operation. MAXERR may specify a value from 1 to 9999 errors. Each error will be indicated by a message and possible MINI DUMP.  
WARNING: On ARCHIVE operations, although MAXERR will allow the DUMP operation to proceed without ABENDING, no data sets will be scratched or uncataloged if any tape or disk errors occur unless AERR=ACC is specified. This option should only be used when necessary and with care.  
Default is 20 errors.
- MAXFILE=** Specifies the maximum file number ABR will create on tape. May specify from 1 to 255. When the maximum file number is exceeded, ABR will start a new tape using file sequence number 1.  
Default is 255.
- MAXGDG=** Specifies that ABR is to ARCHIVE any GDG type data sets which exist on the disk volumes to be scanned and are not within n generations of the most current entry recorded in the catalog. n specifies from 1 to 255. (Ex: MAXGDG=2, ABR will keep the two most current generations, archiving all others if found.)  
WARNING: If you use MAXGDG, you should specify CRDAYS as 2 or higher, or specify DSNENQ, to avoid ARCHIVING data sets that are in the process of being created.
- MGMTCLAS=** Specifies that on SMS-managed volumes, only those data sets whose SMS management class matches one or the class names specified will be considered for selection. Multiple class names are specified in parenthesis. You may also specify multiple MGMTCLAS= parameters with the same result.  
SMSMANAGE=YES must also be specified.
- MIGRAT=** **YES** – specifies that when ABR recatalogs a data set for auto-recall (see the RECALL operand), the first volser in the catalog entry will be changed to "MIGRAT".  
**NO** – specifies that the recatalog for auto-recall will preserve the original volume serial in the catalog entry.  
Default is NO unless overridden in the FDR/ABR global option table ([See Section 91 or 92](#)).
- NOINIT** SIM only. Specifies that ABR is to perform the simulation on the volumes specified, even if it is not initialized for ABR processing or if it was disabled for ARCHIVE or SCRATCH processing. The ABR error message will still be issued.

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## 51.03 CONTINUED . . .

- NOUNCAT** Specifies that ABR is not to uncatalog any data sets that are ARCHIVED or SCRATCHed.  
 Default is ABR will uncatalog all data sets ARCHIVED or SCRATCHed unless they are cataloged to a different volume or to multiple volumes, or unless SCRATCH=NO is specified.  
 ICF VSAM clusters are always uncataloged.  
 NOTE: NOUNCAT and RECALL=YES are mutually exclusive.
- ONLINE**  
**ONLVOL** ABR normally will only process volumes specified by DISKxxxx DD statements.  
**ONLINE** – specifies that ABR is to scan every volume that is ONLINE to the system, These volumes will be appended to the normal DISKxxxx volume list, if any.  
**ONLVOL** – specifies that ABR is to scan the SELECT statements for the operands VOL=, VOLG= or CATDSN= (for volumes selected from the catalog). These volumes, if online, will be appended to the normal DISKxxxx volume list.  
 If ABR finds that the user specified EXCLUDE statements with ALLDSN and VOL or VOLG, these volumes will not be included in the ONLINE list unless a DISKxxxx DD statement is present for this volume.  
 An additional way for the user to specify which volumes are to be processed is the use of the MOUNT command. The MOUNT control statements can be specified after the DUMP statement, and after any SELECT/EXCLUDE statements. The MOUNT command should specify VOL=, VOLG=, or STORGRP=; the ONLVOL option is not required if all volumes to be processed are specified by MOUNT or DISKxxxx statements. These control statements are only used to build a volume list and do not cause particular data sets to be selected.  
 EXAMPLE: MOUNT VOLG=SYS specifies that all online volumes beginning with 'SYS' will be added to the volume list.
- POOLSORT=** **NO** – if the POOLDISK option is specified on one or more TAPEX or TAPEXX DDs in the ABR step (See Section 51.02) the volume in the POOLDISK list will be used in the order specified in the JCL.  
 Default is that the volumes will be sorted based on the amount of available space on each, first using those with the most free space.
- PRINT=** **ABR** – Specifies that ABR is to produce a PRINT VTOC type report showing all the data sets selected.
- RECALL=** **YES** (or just RECALL) – specifies that ABR is to keep the data set to be ARCHIVED cataloged for automatic recall by the CATALOG LOCATE or DATA SET NOT FOUND EXIT, if it is cataloged to this volume. If the data set is cataloged to another volume or not already cataloged, it will not be cataloged for RECALL. If an ICF VSAM cluster is archived, ABR will recatalog the cluster name as non-VSAM. See ABR AUTOMATIC RECALL in Sections 52.20-52.25.  
**NO** – specifies that ABR will uncatalog ARCHIVED data sets if they are cataloged to this volume unless NOUNCAT is specified.  
 Default is NO unless overridden in the FDR/ABR Global Option table (See Section 91 or 92).  
 NOTE: RECALL=YES and NOUNCAT are mutually exclusive.
- REMOTE** Specifies that ABR is to ARCHIVE the data sets requested by the remote queue (program FDRABRUT). REMOTE is ignored on TYPE=SCR. REMOTE is required only if data sets were flagged on disk with the DISKUPDATE=YES option of FDRABRUT, and is automatically included if any other GENERAL ARCHIVE SELECTION CRITERIA keywords are specified on the DUMP statement.

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## 51.03 CONTINUED . . .

- RETPD=** Specifies the number of days the ARCHIVE backup tapes will be kept.  
Default is 365 days.  
(See Retention Period in [Section 52.06](#) for a more detailed explanation).
- SCRATCH** **SCRATCH** or **SCRATCH=IBM** – specifies that ABR will issue the IBM SCRATCH SVC to scratch each data set.  
If a data set selected for ARCHIVE or SUPERSCRATCH is RACF protected, and the userid under which the job is running is not authorized to scratch the data set, then:
- If the RACF or ALLCALL option of FDR is enabled ([Section 91](#)), the lack of authorization is detected at the beginning of the run; the data set is not backed up to the ARCHIVE tape, and no SCRATCH is attempted. This does not depend on the SCRATCH option.
  - If the RACF or ALLCALL option of FDR is not enabled, then the data set is backed up to the ARCHIVE tape, and entered into the Archive Control File. If the SCRATCH option is in effect, then the SCRATCH fails; if not, ABR deletes the data set despite the lack of authorization.
- If the SCRATCH option is in effect, and the SCRATCH succeeds, and the data set has a discrete RACF profile, then the profile will be deleted. If the SCRATCH option is not in effect, then a discrete RACF profile will not be deleted. The rules in this paragraph apply whether or not the RACF or ALLCALL option has been enabled.
- SCRATCH=CAT** – same as SCRATCH except that ABR is to record this data set in the scratch catalog (if installed) if it has a current ABR backup, in addition to following all of the above rules. This may be useful on SUPERSCRATCH to allow ABR to keep track of this data set for the life of the backup.
- SCRATCH=NO** – specifies that ABR will not scratch and uncatalog the data sets which were selected. Since the data sets do not really get archived, ABR will ignore the PROTECT List, and will not require the volume to be enabled for ARCHIVE. Also, ABR will not catalog the backup files, the tapes will be recorded only in the Archive Control File.  
[See Section 51.01](#) and [52.08](#) for a detailed explanation of how the command SCRATCH=NO can be used.
- Default is to use the IBM SCRATCH SVC if the disk volume has an INDEXED VTOC or if ICF VSAM clusters are to be deleted, otherwise ABR will use its own technique for scratching data set entries from the VTOC. At the end of successful ARCHIVE, ABR will (by setting the DOS bit in the format 4 DSCB and allocating a dummy data set) force the VTOC conversion routine to recalculate the free space.
- NOTE: The dummy data set that ABR allocates to invoke the VTOC conversion routine has a name that starts with FDRABR.V. If your installation has a data security system, then the user running the ARCHIVE or SUPERSCRATCH job must be authorized to ALLOCATE this dsname. If this is not possible then specify the SCRATCH operand.
- SELTERR=** **NO** – specifies that ABR is not to set a condition code if a SELECT statement is not referenced.  
**YES** – specifies that ABR will set a condition code at the end of the DUMP if any SELECT/EXCLUDE statement did not apply to any data set on any input disk.  
Default is YES unless overridden in the FDR/ABR global option table ([See Section 91 or 92](#)).

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- SMSCOMMAND=** **NO** – specifies that when selecting data sets from SMS-managed volumes by management class attributes (SMSMANAGE=YES), that SELECT/EXCLUDE statements are NOT to be honored. Data sets will be selected based ONLY on management class attributes. Data sets with the attribute COMMAND-OR-AUTO-MIGRATE=COMMAND will not be selected.  
**YES** – specifies that for SMS data sets with the attribute COMMAND-OR-AUTO-MIGRATE=COMMAND or BOTH, SELECT/EXCLUDE statements in the ABR run may be honored ([See Section 52.50 for details](#)). Note that SMSCOMMAND=YES should be specified on an ARCHIVE run that takes input from the ARCHIVE REMOTE QUEUE if user requests for SMS-managed data sets are to be honored. SMSCOMMAND= applies only to DUMP TYPE=ARC.  
 Default is NO.
- SMSEXPIRE=** **NO** – specifies that no special processing be done for the expiration of ARCHIVED SMS-managed data sets. They receive the normal ABR expirations set from JCL parameters or the RETPD= operand.  
**YES** – specifies that ARCHIVED SMS-managed data sets will receive individual expirations calculated from the attributes of their associated SMS management class. Honored only if SMSMANAGE=YES is also specified. [See Section 52.50](#) for more details.  
**PRT** – same as YES, except that the calculated expirations for each ARCHIVED SMS-managed data set will be displayed.  
 SMSEXPIRE= applies only to DUMP TYPE=ARC.  
 Default is NO.
- SMSCONSTRUCT=** **YES** – specifies that ABR is not to process SMS-managed volumes unless their associated storage group has the attribute AUTO-MIGRATE=YES (and the ABR model for the volume is also enabled for ARCHIVE or SUPERSCRATCH as appropriate).  
**NO** – specifies that ABR bypass selected volumes based only on the ARCHIVE or SUPERSCRATCH options in the ABR model, ignoring the SMS storage class attribute.  
 Default is YES.
- SMSMANAGE=** **NO** – specifies that ABR is not to select data sets from SMS-managed volumes based on the attributes of their SMS management class. Strictly ABR operands will be used for both SMS and non-SMS data sets.  
**YES** – specifies that data sets on SMS-managed volumes are to be selected for ARCHIVE or SUPERSCRATCH based primarily on the attributes of their associated SMS management class ([See Section 52.50 for complete details](#)).  
 Default is NO.
- SMSMINRET=** If SMSEXPIRE=YES or PRT is also specified, this specifies the minimum COPY2 retention to be calculated. This insures a reasonable retention for data sets which would otherwise expire very quickly under management class rules.  
 Default is 30 days.
- SMSTHRESHOLD=** **YES** – specifies that ABR is to use threshold values from the SMS storage group for SMS-managed volumes.  
**NO** – specifies that thresholds from the ABR model DSCB are to be used for thresholding on all volumes.  
 SMSTHRESHOLD= is valid only if THRESHOLD=HIGH/LOW is specified.  
 Default is YES.

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- THRESHOLD=** Specifies whether ABR is to bypass volumes because their current allocation (percent of tracks allocated to data sets) is below a certain threshold. For non-SMS volumes the thresholds may be stored in the ABR model on the volume. For SMS-managed volumes, the threshold may be in the SMS storage group or may be taken from the ABR model.
- NO** – indicates that volumes are not to be bypassed because of allocation thresholds.
- HIGH** – indicates that the threshold to be used is the high threshold in the ABR model DSCB or the SMS storage group.
- LOW** – indicates that the low threshold in the ABR model or SMS storage group is to be used.
- nnn** – is a number from 0 to 100 which will be used as the threshold (values from the ABR model and SMS will not be used).
- Default is NO.
- VALIDATE** Specifies that ABR is to perform data set validation. PROFILE statements in the ABR control statements specify data set naming rules for certain or all disk volumes. Any data sets encountered not meeting those rules will be archived and scratched.
- For ICF VSAM files, ABR will check both the cluster name and the component names. If any of these names are invalid, ABR will archive the entire cluster.
- WARNING: This feature should be executed in SIMULATION mode to ensure that ABR is performing what the user intended.

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## 51.04 SELECT COMMAND for ARCHIVE or SCRATCH

SELECT S	<i>DSN=filter</i>
EXCLUDE X	<i>CATDSN=filter</i> <i>DD=ddname</i> <i>ABRBKUP=vol /</i> <i>TEMP</i> <i>ALLDSN</i>
PROFILEPRO F	<i>,CATALOG=catname  </i> <i>,MCATALOG=catname</i> <i>,CATBYPERR</i> <i>,CATLIMITGDG=n</i> <i>,CRDAYS=dddd *</i> <i>,DATA=ALL</i> <i>,DSORG=(xx,xx..)*</i> <i>,GDG</i> <i>,PRTALIAS</i> <i>,SIZE=nnnnn*</i> <i>,UPDATE</i> <i>,VOL=vvvvvv*   ,VOLG=vvvvv*   ,ALLVOL*</i>
PROTECT PROT	<i>* Data set must meet all of the above specified criteria to be selected by this statement.</i>

**ARCHIVE SELECTION CRITERIA***,ADAYS=dddd**,EXPIRED**,IFNOTCAT**,MAXGDG=nnn*

If any of the above specified  
ARCHIVE criteria is met, the data  
set will be ARCHIVED.

If any of the above specified ARCHIVE criteria is met, the data set will be ARCHIVED.

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**MOUNT**            *VOL=vvvvvv / VOLG=vvvvv / STORGRP=storagegroup*

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<b>SELECT COMMAND</b>	The SELECT Command allows specification of additional data sets to be archived. The SELECT Command will cause ABR to scan for the specified data sets. If a data set meets all of the SELECTION CRITERIA (in the first box above) then this SELECT statement controls the data set. If any of the ARCHIVE SELECTION CRITERIA (second box above) are also specified, it will be archived or scratched if <b>any</b> of them is satisfied. If no ARCHIVE SELECTION CRITERIA operands are given, the data set will be unconditionally archived.	
<b>EXCLUDE COMMAND</b>	If EXCLUDE is coded, ABR will not process the specified data sets. Only SELECTION CRITERIA operands (first box) can be specified.	
<b>PROFILE COMMAND</b>	Used for data set validation only (VALIDATE specified on the DUMP statement). The PROFILE command is used to set data set naming conventions for the disk volumes. PROFILE statements specify valid data set names and can also specify other SELECTION CRITERIA to further define which data sets the naming conventions apply to. These statements precede any SELECT, EXCLUDE, or MOUNT statements. If data sets are found which do not meet the PROFILE for the volume, ABR will ARCHIVE or SCRATCH those data sets.  ARCHIVE SELECTION CRITERIA can also be coded on the PROFILE statement; if the data sets meet those criteria they will be ARCHIVED or SCRATCHED even if they meet the naming convention.  <b>WARNING: This Command is very powerful. Data set validation should first be executed in SIMULATION mode to ensure that ABR is archiving what the user intended.</b>	
<b>PROTECT COMMAND</b>	The PROTECT command is equivalent to the EXCLUDE command. It normally is specified in the ARCHIVE PROTECT LIST but can also be coded in the ABR input stream.	
<b>MOUNT COMMAND</b>	The MOUNT command is used to specify additional volumes to be processed by ABR. VOL=, VOLG=, or STORGRP= must be specified.  NOTE: Data sets are compared to these commands in the sequence they appear in the control statement file, so EXCLUDE or PROTECT commands must be specified before any SELECT or PROFILE commands which reference the same data sets.	
<b>DUMPING ICF VSAM FILES</b>	ICF VSAM clusters can be selected by ABR using only the base cluster name with the DSN= or CATDSN= operand. If selected, ABR will archive or scratch all of the components associated with this cluster which exist on the volumes dumped. This includes alternate indexes and key range components. The component names will be reported by ABR followed by the base cluster name. ABR will dump to the backup file all of the associated VVR records found in the 'SYS1.VVDS' data set. For further information, <a href="#">See Section 52.11</a> , VSAM SPECIAL CONSIDERATIONS.	
<b>OPERANDS</b>	<b>DSN=</b>	Specifies a fully-qualified data set name or a filter to be used for generic data set selection, as described in <a href="#">Section 52.16</a> . This name or filter will be used when scanning the VTOCs of selected volumes.  EXAMPLES:     DSN=USER1. JCL. CNTL DSN=**LI ST DSN=PROD++ . ** . LI B*  DSN= does not have any special support for selecting GDGs. However, if it is used in conjunction with the GDG operand then only GDGs will be selected. If used in conjunction with the MAXGDG=n operand then most recent "n" generations of any selected GDGs will NOT be selected.  NOTE: The DSG= operand documented in previous versions of FDR/ABR is still accepted, but the DSN= operand with a generic data set name filter is the preferred way of selecting groups of data sets.

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## 51.04 CONTINUED . . .

**CATDSN=**

Specifies a fully-qualified data set name or a filter to be used for generic data set selection from system catalogs, as described in [Section 52.16](#).

If a fully-qualified name is specified, that name will be located in the system catalogs, and the volume serial(s) from the catalog become an implied VOL= parameter (if ONLVOL is specified, the volume will be added to the ABR volume list). Specification of a relative generation number for GDG data sets is supported (e.g., CATDSN=A.B( —1)).

If a filter is specified, then catalogs will be scanned for all cataloged data sets matching the filter, and they will be processed as if a SELECT

CATDSN=dsname was present for each of them. It may be necessary to specify MAXCARDS=nnnnn if a large number of data sets are selected by the filter. **Additional considerations for CATDSN=filter are explained in [Section 52.16](#).**

CATDSN= is supported only on SELECT statements.

If the VOL/VOLG= operand is also specified on a SELECT statement with CATDSN=, then only data sets cataloged to those volumes will be selected.

EXAMPLES: CATDSN=USER1. JCL. CNTL  
 CATDSN=\*\*MASTER(O)  
 CATDSN=PROD++. \*\*. LI B\*

Normally CATDSN= will not display the data sets it selects from the catalogs, you will see the names only when ABR actually finds and selects the data sets in the VTOCs of the volumes they are cataloged to. To display all of the data sets selected specify PCATDSN=filter.

WARNING: depending on the filter specified, CATDSN= may need to search many catalogs.

**DD=**

Specifies that a data set name is to be taken from a DD statement. This operand must point to the DDNAME of a JCL statement. Using this option enables the user to specify a non-standard data set name or a generation data set name.

EXAMPLE: SELECT DD=DD1  
 //DD1 DD DSN=A. B. C(O) , DI SP=SHR

**ABRBKUP**

Specifies that ABR is to select ABR backup or archive backup data sets currently on DISK which have expired. This operand should be specified using TYPE=SCR to clean up volumes containing ABR backups which are no longer needed.

If ABRBKUP is specified alone, than all expired ABR backup files will be selected.

If ABRBKUP=vol is specified then only backups containing data sets from volume "vol" will be eligible. "vol" may contain General Selection Characters, such as ABRBKUP=TSO+++ ([See Section 52.16](#)).

NOTE: You cannot use SELECT ABRBKUP to move disk archive files to tape; archive backup files cannot themselves be archived. See FDRTSEL in [Section 10](#).

**TEMP**

Specifies that ABR is to select all non-VSAM data sets which have a name in the format which the system uses for temporary data sets. This may be used with TYPE=SCR to clean up temporary data sets which were not automatically deleted. It is recommended that CRDAYS=2 also be specified to insure that active temporary data sets are not selected.

NOTE: Neither SELECT ALLDSN nor general ARCHIVE criteria on the DUMP statement will select temporary data sets; a SELECT TEMP statement is required.

**ALLDSN**

Specifies that all the data sets encountered on the volumes specified are to be SELECTED or PROTECTED. DSN=\*\* is equivalent to ALLDSN.

NOTE: DSN=, CATDSN=, DD=, TEMP, ABRBKUP and ALLDSN are mutually exclusive. One and only one of them must be specified on each SELECT/EXCLUDE/PROFILE/PROTECT Command.

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## 51.04 CONTINUED . . .

<b>ADAYS=</b>	Specifies that these data sets will be archived if their last reference date plus the number of days specified is less than today's date. If ADAYS is not specified, the last reference date will not be checked. For ICF VSAM clusters the last reference date is only checked on the data component of the base cluster.								
<b>CATALOG=</b> <b>MCATALOG=</b>	Specifies the name of a user catalog (CATALOG=) or alternate master catalog (MCATALOG=) to search when CATDSN= is specified. <a href="#">See Section 52.16</a> for details.  Default is that the catalog search will start with the active master catalog. User catalogs will be searched if their assigned aliases match the CATDSN=filter.								
<b>CATBYPERR</b>	Specifies that, if the CATDSN= operand is used on SELECT statements, any error messages caused by trying to access catalogs which are OS CVOLS, or which have OPEN errors, will be suppressed; those catalogs will be simply bypassed.  Default is that CVOL and OPEN errors will be reported unless CATBYPERR was specified on the DUMP statement.								
<b>CATLIMITGDG=</b>	May be used with CATDSN=filter to limit the selection of GDGs from the catalogs. It will not affect the selection of cataloged non-GDG data sets, but if the filter selects a GDG then:  <b>n</b> will cause only the most recently created "n" generations to be selected.  — <b>n</b> will cause only generation (— n) to be selected.  Default is that all the generations of selected GDGs will be selected (unless a relative generation number is specified at the end of the filter, e.g., CATDSN=filter(— 2)).								
<b>CRDAYS=</b>	Specifies that these data sets is not to be selected unless it is at least dddd days old (creation date).  Default is 0 unless IFNOTCAT is specified then 2 days is assumed.								
<b>DATA=</b>	<b>ALL</b> — specifies that ABR will dump the entire data set. Normally, ABR will only dump up to the last block pointer (end-of-file) on PS or PO data sets. Should be used if the last block pointer is invalid.								
<b>DSORG=</b>	Specifies that these data sets is not to be selected unless its DSORG matches one of the DSORGs specified. If more than one DSORG is specified, they must be enclosed in parentheses.  VALID DSORGS are:  <table> <tr> <td>DA — BDAM</td><td>UN — UNDEFINED</td></tr> <tr> <td>EF — ICF VSAM</td><td>IS — ISAM</td></tr> <tr> <td>PS — SEQUENTIAL</td><td>UM — UNMOVABLE</td></tr> <tr> <td>AM — ALL VSAM</td><td>PO — PARTITIONED</td></tr> </table> NOTE: It is not recommended that ISAM or non-ICF VSAM files be selected for archive.	DA — BDAM	UN — UNDEFINED	EF — ICF VSAM	IS — ISAM	PS — SEQUENTIAL	UM — UNMOVABLE	AM — ALL VSAM	PO — PARTITIONED
DA — BDAM	UN — UNDEFINED								
EF — ICF VSAM	IS — ISAM								
PS — SEQUENTIAL	UM — UNMOVABLE								
AM — ALL VSAM	PO — PARTITIONED								
<b>EXPIRED</b>	Specifies that ABR is to ARCHIVE the data sets specified if the expiration date in the DSCB is equal to or less than today's date. This option does not affect data sets with an expiration date of zero. The expiration date is not checked on VSAM files, unless they are SMS-managed. If SMSMANAGE=YES is specified on a TYPE=SCR run then expired data sets on SMS-managed volumes will not be scratched unless EXPIRED is also specified.								
<b>GDG</b>	Specify that these data sets is not to be selected unless it is part of a generation data group.								

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## 51.04 CONTINUED. . .

<b>IFNOTCAT</b>	<p>Specifies that ABR is to archive these data sets if it is not cataloged to the volume it resides on. If the catalog is not available or any other catalog error exists, ABR will not use this selection criterion. Also ABR will not archive this data set if it is less than 2 days old, unless overridden by using the CRDAYS= keyword. A time delay is necessary not to archive active data sets which will be cataloged at the end of the step or job. VSAM files are always considered cataloged.</p> <p>NOTE: IFNOTCAT can be very expensive to run if the system contains a large number of data sets.</p> <p>Default is that the catalog is not checked.</p>
<b>MAXGDG=</b>	<p>Specifies that ABR is to ARCHIVE the data sets specified if they are GDG type data sets and are not within n generations of the most current generation recorded in the catalog. n specifies from 1 to 255. (Ex: MAXGDG=2, ABR will keep the two most current entries, archiving all others if found.) If you use MAXGDG=, you should also specify CRDAYS= or DSNENQ= to avoid selecting data sets that are in the process of being created.</p>
<b>PRTALIAS</b>	<p>When used on a SELECT statement with CATDSN= will display all of the alias names and user catalogs that were searched.</p>
<b>SIZE=</b>	<p>Specifies that these data sets are not to be selected unless their size in tracks is equal to or larger than the size specified. For ICF VSAM clusters the size is checked for each of the components. If SIZE is to be specified in more than one SELECT statement for the same group name, they must be coded in descending sequence (the largest first).</p>
<b>STORGRP=</b>	<p>Can only be used on the MOUNT command, and only on systems with SMS (System Managed Storage) active. Will select all online volumes in the specified SMS storage group.</p> <p>EX:           MOUNT   STORGRP=DBLARGE</p> <p>will cause ABR to process all volumes in that storage group.</p>
<b>UPDATE</b>	<p>Specifies that the data set or ICF clusters which match this control statement will be selected only if the update indicator in their DSCB in the VTOC is set. ICF clusters will be selected only if the ICFSU60 option is set in the FDR/ABR Global Option table (or if ABR is running on a system with DFP V3 or above); since the update indicator is maintained only in the base data component, ABR will select ICF clusters without the update indicator if the base data component is not on the volume being processed.</p> <p>NOTE: an ARCHIVE job will NOT reset the update indicator; it will be reset only by an ABR full-volume or incremental backup; however, the FDRABRM utility can be used to reset it (<a href="#">See Section 55.06</a>).</p>
<b>VOL=</b>	<p>Specifies a volume serial number. This control statement will apply only to the volume specified.</p>
<b>VOLG=</b>	<p>Specifies a group of volume serials to which this control statement will apply. Any disk volume serial starting with the 1 to 5 characters specified will be searched for the data set.</p>
<b>ALLVOL</b>	<p>Specifies that the data sets indicated on the control statement apply to all the volumes encountered within this execution of ABR.</p> <p>NOTE: VOL, VOLG, STORGRP and ALLVOL are mutually exclusive.</p> <p>Default is ALLVOL.</p>

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**51.05 FDRABR ARCHIVE RESTORE JOB CONTROL REQUIREMENTS**

The following Job Control Statements are necessary to perform RESTORE functions.

**JOB  
STATEMENT**

The JOB statement is user-specified and depends upon installation standards.

**EXEC  
STATEMENT**

Must specify the name of the program to be executed-FDRABR. The basic region size is 1024K. However, some restore options, especially logical restore, may increase the region requirement. If a PARM= is specified, it will be used as the first ABR control statement (e.g., PARM='RESTORE TYPE=ABR'); if the PARM contains a slash (" / ") the data after the slash will be used as the second control statement.

**STEPLIB or  
JOBLIB DD  
STATEMENT**

If your installation requires either of these statements, they must be the library that contains the ABR modules. It must be AUTHORIZED.

**SYSPRINT DD  
STATEMENT**

Specifies the output message data set. This is a required DD statement for all ABR functions and is usually a SYSOUT data set.

**SYSUDUMP DD  
STATEMENT**

Specifies the ABEND dump data set. Although not required, we strongly urge you to always include this DD statement so we can help you diagnose your error conditions. Usually a SYSOUT data set.

**ARCHIVE DD  
STATEMENT**

Specifies the ABR ARCHIVE control file. This DD is required for ARCHIVE restores unless the DYNARC operand is specified. The standard name for this data set is FDRABR.ARCHIVE. ABR uses this data set as an inventory and catalog file for all data sets that have been archived from disk volumes. Specify DISP=SHR since ABR internally serializes access.

**TAPEx DD  
STATEMENT**

Optionally specifies a tape drive to be used for mounting tapes for the RESTORE operation. x is any valid alphanumeric character (0-9, A-Z). This drive will be used for mounting all restore tapes so it must be capable of reading all tape types and densities required. ABR will internally set the dsname, volume serial(s) and file number before OPEN, but to satisfy MVS allocation you must specify:

DSN= – any acceptable name

VOL=SER= – any dummy volser

DISP=(OLD,KEEP)

UNIT=(type,,DEFER) –62 where “type” is an appropriate generic (e.g., 3490) or esoteric (e.g., CART) device type. If you have sufficient tape drives, you can specify a unit count of 2 as the second parm which may reduce elapsed time if multi-volume backup datasets are to be read.

Only the first TAPEx DD in the ABR step JCL will be used.

```
EXAMPLE: //TAPE1      DD      DSN=FDR, VOL=SER=FDR001,
          //          UNI T=( 3480, , DEFER) , DI SP=( OLD, KEEP)
```

If the DYNTAPE option is specified on the RESTORE statement, the TAPEx DD will not be used and can be omitted; ABR will dynamically allocate a drive of the proper type using DD name TAPE#. DYNTAPE must be used when restoring from tapes of mixed types or from disk; ABR will dynamically allocate the proper device types as needed. DYNTAPE is recommended over TAPEx DD statements.

SIMULATION: If SIMREST is coded, this DD usually specifies DUMMY.

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## 51.05 CONTINUED . . .

**ABRARCH DD STATEMENT** Specifies the remote queue data set for restores from the ARCHIVE subsystem. This data set is optional. If specified, ABR will read the control statements contained within, if any, and append these control statements to the SYSIN data set. The SYSIN data set must contain at least a RESTORE TYPE=ARC Command. If the operation is not an ARCHIVE Restore, this file will be ignored. After reading the control cards, ABR will reset the file to a null (empty) data set except on SIMREST.

NOTE: The TSO/ISPF panels or program FDRABRUT write to these remote queue data sets.  
DISP=SHR should be specified for ABRARCH since ABR internally reserves this data set.  
(See Section 54 in the machine-readable copy of the manual only).

**SYSIN DD STATEMENT** Specifies the control statement data set. Required for all ABR functions. Usually an input stream or DD \* data set.



## 51.06 THE ARCHIVE RESTORE COMMAND

```

RESTORE TYPE=ARC
R      ,ALLOCATELIST=NO
SIMREST ,BLKF=nn
        ,BYPASSACS
        ,BYPASSSMS
        ,CATIFALLOC
        ,COPY=n
        ,DATA=ALL
        ,DD=ALL
        ,DSNENQ=NONE / TEST / USE / HAVE
        ,DYNARC
        ,DYNTAPE
        ,ICFCAT=ORIGINAL / STEPCAT / ALIAS
        ,MAXCARDS=nnnn
        ,MAXDD=nnnn
        ,NOCAT | ,RECAT
        ,OPERATOR
        ,PRESTAGE
        ,RESTORED=NO
        ,RLSE | ,%FREE=nn
        ,SELTERR=NO / YES
        ,MSGDG=DEFERRED / ACTIVE / ROLLEDOFF / INPUT
        ,VRECAT

```

NOTE: The ONLINE and ONLVOL operands, and the MOUNT statement are no longer required for RESTORE in V5.1; output volumes will be dynamically allocated as required. They will be accepted but will have no effect.

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## 51.06 CONTINUED . . .

**RESTORE  
COMMAND**

The RESTORE Command with TYPE=ARC activates a restore of individual data sets from the ARCHIVE sub-system. Only one RESTORE statement is allowed per execution of ABR, but any number of data sets can be restored in one ABR step.

**SIMULATED  
RESTORE**

If SIMREST is coded, ABR will print the data set names which will be selected and the volumes necessary to do the restore. A restore operation is not done. It can be used to test RESTORE options or to pre-pull the tapes required.

**ARCHIVE  
RESTORE  
PROCEDURE**

The ARCHIVE RESTORE procedure restores data sets or groups of data sets that were archived by ABR. Since archived data sets usually do not exist on disk, ABR will allocate, catalog and restore the data set (although it will restore to a pre-allocated data set as well).

ABR will also restore ARCHIVED data sets automatically, when invoked from the CATALOG LOCATE or DATA SET NOT FOUND exits.

[Section 52.04](#) details how ARCHIVE RESTORE selects the appropriate ARCHIVE backup file on disk or tape for each data set to be restored. If multiple data sets are to be restored from a given backup, that file will be read only once. While reading a backup file, ABR can restore the selected data sets to one or more disk volumes concurrently. The target disk volume will be selected for each data set by the following rules:

- \* If the NVOL= operand was specified on the SELECT statement which selected this data set, that volume or volumes will be used. If NVOL= specified more than one volume serial, the first of those volumes will be selected; allocation may be attempted on up to 64 of those volumes in turn until it is successful. If the NVOL list includes more than one type of disk device, those with the same type as the input data set ("like" devices) will be tried first. Any volumes in the NVOL list which are not online will be ignored.
- \* If the output data set name (the original name, or the newname if the NEWNAME=, NEWGROUP=, or NEWINDEX= operand was specified on the SELECT statement which selected the data set) is cataloged, then the volume to which it is cataloged will be chosen. If the data set is cataloged as being on multiple volume serials, then the volser will be selected from that list based on the volume sequence number in the F1 DSCB (field DS1VOLSQ) of the input data set.
- \* If none of the above apply, then the serial of the volume from which the data set was dumped, as recorded in the Archive Control File, will be used.
- \* If the data set was not preallocated on the selected volume, and the allocation fails on that volume for any reason, or the selected volume is not online, the ABR RESTORE ALLOCATION LIST will be checked to see if there is a ALLOCATE statement which applies to this data set. If so, the NVOL list from that statement will be used as described above for NVOL=. If there is both an NVOL= list on the SELECT and a matching ALLOCATE, the two NVOL lists will be merged, in the order of ascending device address (UCB address order), not in the order that they appear.

If SMS (System Managed Storage) is active on this system, and the data set does not already exist on the volume selected by the rules above, SMS is invoked to decide if the data set should be SMS-managed. If so, SMS will select an output volume. SMS rules are detailed in [Sections 20.01](#) and [52.50](#).

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## 51.06 CONTINUED . . .

**ALTERNATE  
DEVICE  
SUPPORT**

ARCHIVE RESTORE can restore data sets to a new device type.

A restore to different models of the same device type is a “like” device (physical) restore, treated the same as a restore to the original device and model, as long as the output volume has sufficient space to hold the data sets being restored. For example, a data set backed up from any 3380 can be restored to any 3380 single, double (3380-E) or triple (3380-K) density disk, or any 3390 in 3380 compatibility mode; any 3390 native mode data set can be restored to a single (3390-1), double (3390-2) or triple (3390-3) density disk.

ABR can also restore data sets that were backed up from one device type to a totally different type of disk (an “unlike” device) using a logical restore. For example, data sets can be restored from a backup of a 3380 (any model) to a 3390 (any model). Data sets can be restored from one backup file to both like and unlike devices concurrently. The logical restore occurs automatically when ABR detects the different device type or when reblocking is requested. The logical restore is from the normal ABR physical backup tape; no special logical dump is required.

Logical restore supports most data set organizations (DSORGs) including ICF VSAM. When allocating data sets on an unlike device, ABR will allocate an amount of space roughly equivalent to the size of the input data set in bytes. Pre-allocated data sets must be allocated with this same space.

Details on how physical and logical restore handle each type of data set are in [Section 52.15](#). More detail on restore to different device types is in [Section 52.14](#).

**OPERANDS TYPE=**

**ARC** — specifies a request to restore data sets from the ARCHIVE sub-system. ABR will attempt to restore all the data sets specified by the SELECT Commands or by the DD=ALL option. If the ABRARCH DD Statement is present, ABR will attempt to restore the data sets requested thru the remote queue.

**ALLOCATELIST= NO** — specifies that the ABR restore allocation list is not to be used for the selection of output volumes for the restore.

Default is that the restore allocation list if enabled in the FDR/ABR Option Table will be used as described earlier in this section.

**BLKF=**

Specifies that ABR is to reblock PS fixed and variable format and PO data sets. Except when restoring a PS file to a smaller disk the blocking factor must result in a larger blocksize, otherwise it will be ignored. On partitioned data sets, ABR will set the blocksize to a higher value, but will not actually reblock the members.

BLKF= specifies a value of 1 to 10. 1 is full track blocking (max 32760), 2 half track, to 10 for a tenth of a track blocking. On fixed files ABR will round down to a multiple of the LRECL.

Default is that ABR will not reblock data sets. The restore will fail if the input data set has blocks larger than the track size of the output disk.

**BYPASSACS**

On a system with SMS (System Managed Storage) active, specifies that the SMS ACS (Automatic Class Selection) routines are not to be invoked for data sets which must be allocated by ABR. If a data set has a SMS storage class assigned (see STORCLAS= in [Section 20.08](#)) it will be SMS-managed, and SMS will be invoked to allocate the data set on an SMS-chosen volume, but SMS will not be allowed to override the storage class or management class assigned to the data set.

Default is that on an SMS system, the SMS ACS routines will be invoked for every data set which has to be allocated. The assigned storage and management classes will be passed to those routines, which can approve or override them. A data set will be passed to SMS for allocation if the storage class ACS routine assigns a storage class to the data set.

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## 51.06 CONTINUED . . .

**BYPASSSMS**

On a system with SMS (System Managed Storage) active, specifies that ABR is to directly allocate data sets on SMS-managed volumes, bypassing normal SMS storage group and volume selection. The selected output volume must be a SMS-managed disk volume, and the data sets being restored must have a SMS storage class assigned (see BYPASSACS above and STORCLAS= in [Section 20.08](#)). ABR will allocate and catalog the data sets according to SMS standards.

Normal SMS facilities do not allow allocation of data sets on specific volume serials, but BYPASSSMS will do so, allowing data sets to be located for performance or other reasons. Note that if BYPASSACS is also specified, the assigned SMS classes will not be validity- or authority-checked.

Default is that on an SMS system, for data sets which are SMS-managed and allocated by ABR, the SMS storage group ACS routine will be invoked to select a storage group and SMS will select a SMS-managed volume and allocate and catalog the data sets.

BYPASSACS and BYPASSSMS are primarily for use by storage administration personnel, since they bypass normal SMS allocation controls and rules. In order to use BYPASSACS or BYPASSSMS, the user of ABR must be authorized to the RACF profile

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in class FACILITY, or the equivalent in other security systems.

**CATIFALLOC**

Specifies that non-VSAM output data sets will be cataloged by ABR even if they were preallocated (not allocated by ABR); the output data set will be cataloged if it is not already cataloged on another volume (unless the RECAT operand was specified).

Default is that ABR will catalog the output data sets only when it allocates them.

**COPY=**

Specifies the copy of the backup from which the restore is to be attempted. COPY=2 can be specified if a duplicate tape copy was created during archival, or by FDRTCOPY.

Default is COPY=1 unless COPY1 was not created or has expired, then COPY2 is the default if it exists. The default can be made COPY=2 in the FDR/ABR Global Option table ([See Sections 91 or 92](#)).

**DATA=**

**ALL** — specifies that ABR will restore the entire data set from the archived copy. Normally, ABR will only restore up to the last block pointer (end-of-file) on PS or PO data sets. Should be used if the last block pointer is invalid. This option should not be used unless DATA=ALL was specified when the data set was archived. DATA=ALL should not be specified with RLSE and %FREE.

Default is USED.

**DD=**

**ALL** — specifies that ABR is to scan all the DISKxxxx DD Statements for the DSNNAME coded. ABR will attempt to restore these data sets, processing them as though they had been requested on a SELECT command that specified DSN= with no other operands.

DSNENQ=NONE is the default on these data sets.

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## 51.06 CONTINUED . . .

**DSNENQ=** Specifies that ABR is to enqueue all of the data sets being restored. ABR will issue an exclusive enqueue with a major name of 'SYSDSN' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, ABR will issue a warning message for the data set. The data set will not be restored. A condition code will be set at the end of the ABR execution unless ENQERR=NO is specified. ABR will not enqueue on data sets which it has allocated.

**TEST** — The data sets will only be tested to see if they are active at the time the restore starts. The data set will not be enqueued.

**USE** — The data sets will be enqueued for the duration of the restore. If not available, the data set will not be restored.

**HAVE** — The data sets will be enqueued for the duration of the restore. If not available, ABR will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. If WAIT is specified, ABR will wait for the data set to become available. The job could time out. If NOWAIT is specified, ABR will print a warning message for the data set and will not restore the data set. If RETRY is specified, ABR will attempt the enqueue again.

**NONE** — No data set ENQ will be issued.

NOTE: If the data set is specified in a DD statement in the ABR job with DISP=SHR, ABR will change the scheduler enqueue for the data set to EXCLUSIVE (DISP=OLD) if the user specifies TEST, USE or HAVE. The operator cannot respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.

CAUTION: This option should not be used on shared DASD unless a cross-system enqueue facility is available and the SYSDSN QNAME is broadcast across systems. Without this capability, ABR can only determine which data sets are active on the system ABR is running on.

Default is TEST.

**DYNARC** Specifies that ABR is to dynamically allocate the ARCHIVE control file, using the data set name in the ABR Global Option Table, instead of using the ARCHIVE DD statement. ABR will allocate this file to DD ARCHIVE#. Default name is 'FDRABR.ARCHIVE'.

Default is that ABR will use the ARCHIVE DD statement specified in the JCL stream.

**DYNTAPE** Specifies that ABR is to dynamically allocate the backup medium, using a DDNAME of TAPE#. This option should be used if the backup is on disk or a mix of backup mediums are to be used (ex: 3400, 3480 or disk). ABR also will dynamically allocate a SYSPRIN# DD statement to SYSOUT=\* for messages from the RESTORE operation. If SYSOUT=\* is not appropriate, you should supply a suitable SYSPRIN# DD statement in the JCL stream.

Default is that ABR will use the first TAPE# DD statement found and will use a SYSPRIN# DD with 'x' matching the TAPE#; this SYSPRIN# DD statement must be supplied by the user.

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## 51.06 CONTINUED . . .

<b>ICFCAT=</b>	<p>ICF VSAM files only. Specifies the source of the catalog name to be used by ABR if an output ICF VSAM cluster is to be allocated.</p> <p><b>ORIGINAL</b> — on a restore to the same name, specifies that ABR is to use the catalog in which the original dumped cluster was cataloged.</p> <p>On a restore to a new name, ICFCAT=ORIGINAL is ignored, and ICFCAT=ALIAS normally is used. If it is desired to catalog the output cluster into the same catalog as the input cluster, the user must specify ICFCAT=STPCAT, and must supply a STPCAT DD statement pointing to that catalog.</p> <p><b>STPCAT</b> — specifies that ABR is to use the STPCAT as the catalog. If a STPCAT DD statement is not supplied, ABR will use the master catalog or the catalog which is aliased for this data set in the master catalog.</p> <p><b>ALIAS</b> — specifies that ABR is to determine the catalog from the alias name in the master catalog. If no alias is found, and the cluster is being restored to the same name, ABR will use the input cluster's catalog. If no alias is found, and the cluster is being restored to a new name, ABR will use the STPCAT (if present in the JCL) or the master catalog. Multi-level alias is supported.</p> <p>Default: ORIGINAL, except that if the cluster is being restored to a newname (NEWGROUP or NEWINDEX specified) the default is ALIAS. If the output cluster is SMS-managed, ALIAS is forced.</p>
<b>MAXCARDS=</b>	<p>Enables ABR to accept additional SELECT, EXCLUDE and MOUNT Commands during this execution.</p> <p>Default is 100 SELECT, EXCLUDE and MOUNT Commands.</p>
<b>MAXDD=</b>	<p>Enables ABR to accept additional DISKxxxx DD Statements.</p> <p>Default is 256 volumes.</p>
<b>NOCAT RECAT</b>	<p><b>NOCAT</b> specifies that ABR will not catalog any output data sets. This option is ignored for ICF VSAM clusters and SMS-managed data sets, since these must always be cataloged.</p> <p><b>RECAT</b> specifies that ABR should catalog non-VSAM output data sets even if they are currently cataloged to another volume.</p> <p>Default: ABR will catalog output non-VSAM data sets unless they are currently cataloged to another volume. Allocation of SMS-managed data sets will fail if they cannot be cataloged.</p> <p>NOTE: NOCAT and RECAT are mutually exclusive. ABR will normally only attempt to catalog output data sets which it allocates (not pre-allocated) unless the CATIFALLOP operand is specified.</p>
<b>OPERATOR</b>	<p>Specifies that an operator message will be issued for each backup volume necessary to complete the restore. This option gives the operator the ability to bypass a tape which may not be available at this time.</p>
<b>PRESTAGE</b>	<p>Specifies that ABR is not to restore a data set if the output data set already exists on the first output volume selected. This may be used to avoid restoring data sets which have already been restored.</p> <p>Default is that ABR will restore to pre-allocated data sets, overlaying the existing contents of those data sets. If the data sets do not exist, they will be allocated.</p>
<b>RESTORED=</b>	<p><b>NO</b> — specifies that ABR is not to restore any data sets selected if they are marked in the ARCHIVE control file as having been previously restored.</p>

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## 51.06 CONTINUED . . .

**RLSE**  
**%FREE=**

**RLSE** — specifies that ABR is to release all of the unused space in the output data sets for selected PS and PO data sets.

**%FREE=nn** — specifies a percentage (nn%) of the PS and PO data sets to be left free after the restore. The data sets will not be expanded in size from the original allocation of the input data set. nn may range from zero (0) which will free all of the free space (same as RLSE) to 99 which will attempt to leave the data sets with 99% free space.

Space will be released only from data sets allocated by ABR.

Default is that ABR allocates the output data sets the same size as the input data sets (unless overridden by TRK=/CYL= on the SELECT statement).

**SELTERR=**

**NO** — specifies that ABR is not to set a condition code if a SELECT statement is not referenced.

**YES** — specifies that ABR will set a condition code at the end of the RESTORE if any SELECT/EXCLUDE statement specified a data set which could not be found.

Default is YES unless overridden in the FDR/ABR global option table ([See Section 91 or 92](#)).

**SMSGDG=**

Specifies the status of SMS-managed GDG (Generation Data Group) data sets, if allocated by ABR.

**DEFERRED**, **ACTIVE**, or **ROLLEDOUT** will set the GDG to that status.

INPUT will set the GDG to the original SMS status of the GDG generation, as recorded on the backup tape. If the original GDG was non-SMS, it will be set ACTIVE if that generation is **currently** cataloged, otherwise DEFERRED.

Default is DEFERRED.

**VRECAT**

Allows ICF VSAM clusters to be allocated and cataloged even if they already exist in the target ICF catalog. If the output cluster does not exist on the output volume selected, but the cluster name is in the catalog, the cataloged cluster will be scratched (by DELETE or, if that fails, DELETE NOSCRATCH). VRECAT is useful when restoring a cluster when its catalog has been restored, but the cluster on disk has not, or when restoring a cluster to a new volume. VRECAT is ignored for ICF catalogs and when the restore does not include the base data component.

Default is that ICF VSAM clusters cannot be allocated if the cluster name already exists in the catalog (even if the catalog points to the output volume).

**WARNING: VRECAT will DELETE the original cluster, with all its components, alternate indexes and PATHs, from the catalog and disks. If the DELETE fails for some reason, the DELETE NOSCRATCH may leave uncataloged components on disk.**

## 51.07 SELECT COMMAND FOR ARCHIVE RESTORE OPERATION

```

SELECT  DSN=filter | DD=ddname | ALLDSN
      S  ,ADATE=yyddd
EXCLUDE ,BLKF=nn
      X  ,COPY=n
        ,DATA=ALL
        ,DATACLAS=dataclass | ,NULLDATACLAS
        ,DSNENQ=NONE
        ,MGMTCLAS=managementclass | ,NULLMGMTCLAS
        ,NEWNAME=newdsname | ,NEWGROUP=newgroup |
        ,NEWINDEX=newindex | ,NEWDD=ddname
        ,NOCAT | ,RECAT
        ,NOTIFY=userid
        ,NVOL=(vvvvvv,vvvvvv,...)
        ,OLDBACKUP=nn
        ,PRESTAGE
        ,RESTORED=NO
        ,RLSE
        ,%FREE=nn
        ,STORCLAS=storageclass | ,NULLSTORCLAS
        ,TRK=nnnnn | ,CYL=nnnnn
        ,VOL=vvvvvv
        ,VRECAT

```

**SELECT  
DATA SET  
COMMAND  
FOR RESTORE**

This control statement selects the data sets to be restored from ARCHIVE backups. The **SELECT** command identifies the individual data set name or group of data sets to be processed. The **EXCLUDE** command identifies data sets from within those selected by SELECT statements which are not to be processed. As described in [Section 52.04](#), ABR will select the backups of the selected data sets using information in the Archive Control File, locate the indicated backup on tape or disk, and restore it. EXCLUDE statements should only contain the operands DSN=, DD=, ALLDSN, or VOL=. A maximum of 100 of these control statements may be used in one execution unless overridden by MAXCARDS=.

**The control statements are always scanned in the order in which they were input, so in general, EXCLUDE statements should precede SELECT statements.** Since ABR will only restore data sets which are selected, EXCLUDE statements are required only to exclude certain data sets from within a larger group on a SELECT statement.

Example 1. Select all data sets with a first index of "A" except those with a second index of "B":

```

EXCLUDE  DSN=A. B. **
SELECT   DSN=A. **, ADATE=90123

```

Example 2: Select all data sets archived from volume TSO001 except those beginning with "ABC":

```

EXCLUDE  DSN=ABC**
SELECT   ALLDSN, VOL=TSO001

```

NOTE: If duplicate data set names from the same volume are found on the ARCHIVE control file, ABR will only select the most recently archived data set that meets the selection criteria (ADATE or RESTORED=NO), and will bypass earlier versions.

CONTINUED . . .



## 51.07 CONTINUED . . .

**NEWNAME/  
NEWGROUP/  
NEWINDEX  
for ICF VSAM**

If you are restoring to a pre-allocated ICF VSAM cluster, where the cluster name is the same as the original, but the components may be named differently (especially if the component names were defaulted and assigned "timestamp" names prior to DFP V3), you must specify the cluster name as both DSN= and NEWNAME=; this causes ABR to LOCATE the new component names. NEWNAME= cannot be specified for clusters with more than one alternate index.

If restoring an ICF VSAM cluster to a new name, if the new cluster must be allocated, you should specify NEWGROUP= or NEWINDEX=. ABR will modify both the cluster and component names. This is illustrated in [Section 20.11](#).

See [Section 52.11](#) for VSAM SPECIAL CONSIDERATIONS.

<b>OPERANDS</b>	<b>DSN=</b>	Specifies a fully-qualified data set name or a filter to be used for generic data set selection, as described in <a href="#">Section 52.16</a> . This name or filter will be used when scanning the Archive Control File.
	EXAMPLES:	DSN=USER1. JCL. CNTL DSN=**LI ST DSN=PROD++.*. LI B*
		NOTE: The DSG= operand documented in previous versions of FDR/ABR is still accepted, but the DSN= operand with a generic data set name filter is the preferred way of selecting groups of data sets.
	<b>DD=</b>	Specifies the DDNAME of a DD statement containing the data set name to be restored.
	<b>ALLDSN</b>	ADATE= and perhaps VOL= should also be specified, to request that all data sets archived on the date specified are to be restored. ALLDSN without additional qualifiers may attempt to restore <b>ALL</b> data sets in the Archive Control File.  NOTE: DSN=, DD= and ALLDSN are mutually exclusive. One and only one of these operands must be specified on each SELECT and EXCLUDE command.
	<b>ADATE=</b>	Only data sets which were archived on the julian date specified (yyddd) will be selected. Used to qualify a data set on the Archive Control file if the same data set name was ARCHIVED multiple times.  If the data set was archived multiple times on the same day, OLDBACKUP= may also be specified to indicate which to restore.
	<b>BLKF=</b>	Specifies that ABR is to reblock PS fixed and variable formats and PO data sets. Except when restoring a PS file to a smaller disk the blocking factor must result in a larger blocksize, otherwise it will be ignored. On partitioned data sets, ABR will set the blocksize to a higher value, but will not actually reblock the members.  BLKF= specifies a value of 1 to 10. 1 is full track blocking (max 32760), 2 half track, to 10 for a tenth of a track blocking. On fixed files ABR will round down to a multiple of the LRECL.  Default is that ABR will not reblock data sets unless BLKF= was specified on the RESTORE statement. The restore will fail if the input data set has blocks larger than the track size of the output disk.

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## 51.07 CONTINUED . . .

<b>COPY=</b>	<p>Specifies the copy of the backup from which the restore is to be attempted. COPY=2 can only be specified if a duplicate tape copy was created during archival or by FDRTCOPY.</p> <p>Default is COPY=1 unless COPY1 was not created or has expired, then COPY2 is the default if it exists. The default can be made COPY2 in the FDR/ABR Global Option table (See Section 91 or 92) or by COPY=2 on the RESTORE statement.</p>
<b>DATA=</b>	<p><b>ALL</b> — specifies that ABR will restore the entire data set from the archived copy. Normally, ABR will only restore up to the last block pointer (end-of-file) on PS or PO data sets. Should be used if the last block pointer is invalid. This option should not be used unless DATA=ALL was specified when the data set was archived.</p> <p>Default is USED, unless DATA=ALL was specified on the RESTORE statement.</p>
<b>DATACLAS=</b> <b>NULLDATACLAS</b>	<p>On a system with SMS active, specifies the SMS data class to be associated with the data set being restored, overriding the original data class of the data set (if any).</p> <p>NULLDATACLAS changes the data class to null (not specified).</p> <p>Default is that the original data class of the input data set (if any) will be associated with the output data set if it is allocated as SMS-managed.</p>
<b>DSNENQ=</b>	<p><b>NONE</b> — specifies that ABR is not to test to see if the data set being restored is currently active.</p> <p>Default is DSNENQ=TEST unless DSNENQ= was specified on the RESTORE statement; If another job or user has the data set allocated, ABR will not restore the data set.</p>
<b>MGMTCLAS=</b> <b>NULLMGMTCLAS</b>	<p>On a system with SMS active, specifies the SMS management class to be presented to the SMS management class ACS routine for the data set being restored, overriding the original management class of the data set (if any). The ACS routine may accept or override this class.</p> <p>NULLMGMTCLAS changes the management class to null (not specified).</p> <p>Default is that the original management class of the input data set (if any) will be passed to the ACS routine for the output data set if it is allocated as SMS-managed.</p>
<b>NEWNAME=</b> <b>NEWN=</b>	<p>Specifies that ABR is to restore the data set to a new name. NEWNAME should only be used with DSN= or DD=, and should not be used for ICF VSAM clusters if they must be allocated. If the newname ends in a GDG relative generation number, e.g., NEWNAME=gdgname(—1), a LOCATE will be done to get the proper absolute generation number.</p>

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## 51.07 CONTINUED . . .

**NEWGROUP=**  
**NEWG=** Specifies that the data sets are to be restored using a new group name. The number of characters specified will replace left to right the data set name. The NEWG operand must not be larger than the DSG operand, if specified. Care should be taken when periods are used that index levels are not incorrectly changed. ABR will check the new names for valid IBM standards.

EXAMPLE:        SELECT    DSG=ABC, NEWG=XYZ  
                 Any data sets restored will be renamed starting with  
                 characters XYZ.

**NEWINDEX=**  
**NEWI=** Specifies that the data set is to be restored with one or more index levels being added or replaced in the original name. ABR will use each index level specified in NEWI in place of the original index level. If a period is specified without any characters preceding, ABR will copy the original index level. If + is specified, ABR will insert the characters following a plus as a new index level. If ++ is specified, ABR will add the characters following the plus-plus to the end of the original name. If — is specified, ABR will drop an index level and its preceding period from the original name.

ABR will check the new names for valid IBM standards.

EXAMPLE:        SELECT    DSN=A. B. C, NEWI =XYZ. ++END  
will result in the newname 'XYZ.B.C.END'

                 SELECT    DSN=PAY. MASTER. \*\*, NEWI =. TESTMAST  
will result in the newname 'PAY.TESTMAST.xxxxx '.

                 SELECT    DSN=A. B. C. D. NEWI =. —X  
will drop the middle two index levels and replace the last, resulting in newname 'A.X'

If the NEWINDEX value ends in a GDG relative generation number, e.g., NEWI=..NEWMAS(— 2), that relative number will be added to the end of the newname, and a LOCATE done to get the proper absolute generation number.

**NEWDD=** Specifies the name of a DD statement from which ABR will obtain the NEWNAME for the restore.

NOTE: NEWN=, NEWG=, NEWI=, NEWDD= are mutually exclusive. If not specified, the data set will be restored using the original name.

**NOCAT**  
**RECAT** **NOCAT** specifies that ABR will not catalog any output data sets selected by this statement. This option is ignored for ICF VSAM clusters and SMS-managed data sets, since these must always be cataloged.

**RECAT** specifies that ABR should catalog non-VSAM output data sets selected by this statement even if they are currently cataloged to another volume.

Default: ABR will catalog output non-VSAM data sets unless they are currently cataloged, unless overridden by NOCAT/RECAT on the RESTORE statement.

NOTE: NOCAT and RECAT are mutually exclusive. ABR will normally only attempt to catalog output data sets which it allocates (not pre-allocated) unless the CATIFALLOP operand is specified. If non-VSAM data sets were archived with the RECALL option, RECAT is required to recatalog them with the auto-recall indicator turned off.

**NOTIFY=** Specifies that ABR is to notify the USERID specified at the completion of the restore. The USERID is from 1 to 7 characters.

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## 51.07 CONTINUED . . .

<b>NVOL=</b>	<p>Specifies the volume serials for output disk volumes to which data sets selected by this statement are to be restored. A single volume serial may be specified as NVOL=volser or multiple volume serials may be specified:</p> <ol style="list-style-type: none"> <li>1) A list of volume serials may be given, enclosed in parentheses, e.g., NVOL=(TSO001,TSO002,TSO003)</li> <li>2) A volume group may be specified by placing an asterisk at the end of the volser prefix, e.g., NVOL=TSO*</li> <li>3) The two may be combined, e.g., NVOL=(TSO*,PROD*,ABC001)</li> <li>4) All online disk volumes may be selected by NVOL=*</li> </ol> <p>Volume serials which are not online will be ignored. ABR will attempt to allocate the output data sets on the first volume specified. If an allocation fails, it will be retried on the next volume in the list (in ascending device address order) until it succeeds (or until it fails on 64 volumes). If the list contains several disk device types, "like" volumes (same type as the data set being restored) will be tried first, then unlike devices.</p> <p>Specifying multiple volsers or a group allows ABR to restore data sets in one pass even when no one volume has available space to contain them all.</p> <p>Default is that the output volume will be selected by rules defined in <a href="#">Section 51.06</a>. Note that when NVOL= is specified, and data sets are selected which are currently allocated and cataloged, ABR will restore them to the new volumes, and not to the volume on which they are cataloged.</p> <p>On a system with SMS active, NVOL= may be ignored if the data set does not exist on the volume specified and the data set is SMS-managed (see STORCLAS=).</p>
<b>OLDBACKUP=</b>	<p>When a given data set has been archived more than once, specifies which versions to restore. 0 restores the most recently archived version, 1 the next most recent, etc., up to a maximum of 127. If ADATE= is also specified, OLDBACKUP= selects from multiple backups of the data set on that date only. (0 selects the last one archived on that date, etc.).</p> <p>Default is 0.</p>
<b>PRESTAGE</b>	<p>Specifies that ABR is only to restore the data sets specified if they do not currently exist on disk the first output disk ABR selects (<a href="#">See Section 51.06</a>).</p>
<b>RESTORED=</b>	<p><b>NO</b> — Specifies that ABR is not to restore the data sets if they are marked in the ARCHIVE Control File as having been previously restored.</p>
<b>RLSE</b> <b>%FREE=</b>	<p><b>RLSE</b> — specifies that ABR is to release all of the unused space in the output PS and PO data sets selected by this statement.</p> <p><b>%FREE=nn</b> — specifies a percentage (nn%) of the PS and PO data sets to be left free after the restore. The data sets will not be expanded in size from the original allocation of the input data set. nn may range from zero (0) which will free all of the free space (same as RLSE) to 99 which will attempt to leave the data sets with 99% free space.</p> <p>Space will be released only from data sets allocated by ABR.</p> <p>Default is that ABR allocate the output data sets the same size as the input data sets (unless overridden by TRK=/CYL= on the SELECT statement or by RLSE/%FREE= on the RESTORE statement).</p>
<b>STORCLAS=</b> <b>NULLSTORCLAS</b>	<p>On a system with SMS active, specifies the SMS storage class to be presented to the SMS storage class ACS routine for the data set being restored, overriding the original storage class of the data set (if any). The ACS routine may accept or override this class.</p> <p>NULLSTORCLAS changes the storage class to null (not specified).</p> <p>Default is that the original storage class of the input data set (if any) will be passed to the ACS routine for the output data set.</p> <p>If the storage class ACS routine assigns a storage class to this data set, the data set will be allocated as SMS-managed.</p>

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## 51.07 CONTINUED . . .

<b>TRK=</b>	If ABR is to allocate the data set, specifies the number of cylinders or tracks to be used for the space allocation. On PS or PO files, this value must be at least equal to the used portion of the data set. On all other types of files, this value must be equal to or greater than the original size of the file. For ICF VSAM clusters, modifies the size of the base data component only.
<b>CYL=</b>	Default is that ABR will use the original size of the data set.
<b>VOL=</b>	Specifies the disk volume serial number from which the data set name was ARCHIVED. This operand is used to further delineate a data set on the ARCHIVE Control File if the data set name was ARCHIVED multiple times. (See Data Set Restore Rules in <a href="#">Section 52</a> for a more detailed explanation).
<b>VRECAT</b>	<p>Allows ICF VSAM clusters to be allocated and cataloged even if they already exist in the target ICF catalog. If the output cluster does not exist on the output volume selected, but the cluster name is in the catalog, the cataloged cluster will be scratched (by DELETE or, if that fails, DELETE NOSCRATCH).</p> <p>VRECAT is useful when restoring a cluster when its catalog has been restored, but the cluster on disk has not, or when restoring a cluster to a new volume. VRECAT is ignored for ICF catalogs and when the restore does not include the base data component.</p> <p>Default is that ICF VSAM clusters cannot be allocated if the cluster name already exists in the catalog (even if the catalog points to the output volume) unless VRECAT was specified on the RESTORE statement.</p> <p>NOTE: VRECAT is especially useful at a disaster-recovery site, when catalogs have been restored but the volumes have not.</p> <p><b>WARNING: VRECAT will DELETE the original cluster, with all its components, alternate indexes and PATHs, from the catalog and disks. If the DELETE fails for some reason, the DELETE NOSCRATCH may leave uncataloged components on disk.</b></p>

## 51.08 FDRABR ARCHIVE DUMP EXAMPLES

**ARCHIVE  
ON LAST  
REFERENCE  
DATE**

ARCHIVE data sets from two disk volumes which have not been referenced in the last 30 days. Any data set on those volumes which was marked for archiving by the DISKUPDATE=YES option of remote queue will also be selected. The backup tapes are to be kept for 180 days, and are compressed. A duplicate tape copy (TAPE11) is to be created. DYNARC specifies that the name of the Archive Control File is taken from the ABR Global Option table and dynamically allocated; at the end of the run the Archive Control File will be backed up as an ABR incremental backup.

```
//ARCHI VE      EXEC      PGM=FDRABR, REGI ON=2224K
//SYSPRI NT      DD        SYSOUT=*
//SYSPRI N1      DD        SYSOUT=*
//SYSUDUMP       DD        SYSOUT=*
//TAPE1          DD        DSN=ARC1, DI SP=(, KEEP), UNI T=TAPE
//TAPE11         DD        DSN=ARC11, DI SP=(, KEEP), UNI T=TAPE
//DI SK1         DD        UNI T=DI SK, VOL=SER=000100, DI SP=OLD
//DI SK2         DD        NI T=DI SK, VOL=SER=SYSRES, DI SP=OLD
//SYSI N         DD        *
DUMP             TYPE=ARC, ADAYS=30, RETPD=180, DYNARC, COMPRESS=ALL
```

**ARCHIVE ON  
ALL ONLINE  
VOLUMES**

ARCHIVE data sets on any online disk volume which have not been referenced in 60 days OR which are not cataloged. Any archive requests which were added to the ABRARDQ remote queue data set by the DISKUPDATE=NO option of remote queue will also be selected. The ABR Last Tape Option is used; if a previous ABR run used the same LASTAPE dsname, ABR will mount the last tape it used and add backup files to it. The backup of the ARCHIVE control file will be done by DSF, creating file FDRABR.ARCBKUP at the end of the backup tape. The backup tape files will be retained for 365 days, by default.

```
//ARCHI VE      EXEC      PGM=FDRABR, REGI ON=1200K
//SYSPRI NT      DD        SYSOUT=*
//SYSPRI N1      DD        SYSOUT=*
//SYSUDUMP       DD        SYSOUT=*
//ARCHI VE      DD        DSN=FDRABR. ARCHI VE, DI SP=SHR
//TAPE1          DD        DSN=FDRABR. LASTAPE. ARC1,
//                UNI T=TAPE, DI SP=(MOD, KEEP)
//ABRARDQ        DD        DSN=FDRABR. ABRARDQ. DATA, DI SP=SHR
//SYSI N         DD        *
DUMP             TYPE=ARC, ONLI NE, ADAYS=60, I FNOTCAT, ARCBKUP=DSF
```

**ARCHIVE  
SPECIFIED  
DATA SETS**

A group of data sets beginning with 'ABC' is to be unconditionally ARCHIVED from disk volume 'TS0123'. However a subset of the data sets starting with 'ABC.DATA' is not to be ARCHIVED. The ONLVOL option allows ABR to dynamically allocate the disk volume. All tracks of the data sets including the free space are to be dumped. Two backup copies will be created using the Last Tape Option for each.

```
//ARCHI VE      EXEC      PGM=FDRABR, REGI ON=1200K
//SYSPRI NT      DD        SYSOUT=*
//SYSPRI N1      DD        SYSOUT=*
//SYSUDUMP       DD        SYSOUT=*
//ARCHI VE      DD        DSN=FDRABR. ARCHI VE. MASTER, DI SP=SHR
//TAPE1          DD        DSN=FDRABR. LASTAPE. ARC1, UNI T=TAPE,
//                DI SP=(MOD, KEEP)
//TAPE11         DD        DSN=FDRABR. LASTAPE. ARC11, UNI T=TAPE,
//                DI SP=(MOD, KEEP)
//SYSI N         DD        *
DUMP             TYPE=ARC, DATA=ALL, ONLVOL
EXCLUDE          DSN=ABC. DATA**
SELECT           DSN=ABC**, VOL=TS0123
```

CONTINUED . . .

## 51.08 CONTINUED . . .

**SIMULATION** SIMULATE an ARCHIVE procedure on a group of disk volumes whose serials start with 'MAST', to verify that the proper data sets will be selected when the ARCHIVE is actually run. All data sets larger than 1000 tracks will be selected if they are not referenced in 10 days, data sets with 500 to 1000 tracks in 30 days, all others if they have not been referenced in 60 days.

```
//SI M          EXEC      PGM=FDRABR
//SYSPRI NT      DD        SYSOUT=*
//SYSPRI N1      DD        SYSOUT=*
//TAPE1          DD        DUMMY
//SYSI N         DD        *
                SI M      TYPE=ARC
                SELECT    ALLDSN, SI ZE=1001, ADAYS=10
                SELECT    ALLDSN, SI ZE=500, ADAYS=30
                SELECT    ALLDSN, ADAYS=60
                MOUNT      VOLG=MAST
```

**DATA SET NAME ENFORCEMENT** Data set naming conventions are to be enforced for all volumes whose volume serial number starts with 'TSO'. Data sets with the string 'ISPF' anywhere in their name or whose second index level begins with 'TST' are to be allowed on all volumes but will be ARCHIVED if they have not been referenced for 60 days or if their expiration date has been reached. Data sets starting with 'MASTERn.' are valid on volumes whose volser starts with 'TSOX', but will be ARCHIVED if they have not been referenced in the last ten (10) days. Data sets starting with 'PAYROLL' are to be protected from ARCHIVE. All other data sets will be ARCHIVED unless they are currently in use.

```
//VALI DATE      EXEC      PGM=FDRABR, REGI ON=1200K
//SYSPRI NT      DD        SYSOUT=*
//SYSPRI N1      DD        SYSOUT=*
//SYSUDUMP       DD        SYSOUT=*
//ARCHI VE       DD        DSN=FDRABR. ARCHI VE, DI SP=SHR
//TAPE1          DD        DSN=FDR, DI SP=( , KEEP) , UNI T=TAPE
//SYSI N         DD        *
                DUMP      TYPE=ARC, ADAYS=60, EXPI RED, VALI DATE, ONLVOL, DSNENQ=USE
                EXCLUDE   DSN=PAYROLL**
                PROFI LE   DSN=**I SPF**, VOLG=TSO
                PROFI LE   DSN=*. TST**, VOLG=TSO
                PROFI LE   DSN=MASTER+. **, ADAYS=10, VOLG=TSOX
                MOUNT      VOLG=TSO
```

**WARNING:** This procedure should first be run in SIMULATION mode to detail which data sets will be ARCHIVED.

**ARCHIVE BASED ON THRESHOLDS** Archive data sets that have not been used in the last 30 days, but only from volumes where the percentage of tracks allocated exceeds a "low threshold" for the volume stored in the ABR Model DSCB or, for SMS-managed volumes, in the SMS storage group.

```
//THRESHL D      EXEC      PGM=FDRABR, REGI ON=2224K
//SYSPRI NT      DD        SYSOUT=*
//SYSPRI N1      DD        SYSOUT=*
//SYSUDUMP       DD        SYSOUT=*
//TAPE1          DD        DSN=FDR, DI SP=( , KEEP) , UNI T=TAPE
//SYSI N         DD        *
                DUMP      TYPE=ARC, ADAYS=30, THRESHOLD=LOW, DYNARC, COMPRESS=ALL
                MOUNT      VOLG=SRCX
```

## 51.09 FDRABR AUTO RECALL AND POOLDISK EXAMPLES

**ARCHIVE FOR  
AUTO RECALL**

ARCHIVE data sets using the AUTO RECALL option; all data sets selected for archive will be left cataloged with a flag indicating that they are archived; ICF VSAM clusters will be recataloged as non-VSAM. DYNARC is used to allocate the standard ARCHIVE control file, since it is the only one used for auto-recall. COPY1 of the backup data set will be placed on a pool of disk volumes with a retention period of 30 days. A duplicate copy will be created on 3480 scratch tapes with a retention of 1000 days. Both copies will be compressed.

```
//ARCHI VE      EXEC      PGM=FDRABR, REGI ON=2224K
//SYSPRI NT      DD        SYSOUT=*
//SYSPRI N1      DD        SYSOUT=*
//TAPE1          DD        DSN=FDRABR. POOLDI SK. ARCHI VE1,
//              DI SP=OLD, UNI T=DI SK, LABEL=RETPD=30,
//              VOL=SER=( ARC100, ARC101, ARC102, ARC103)
//TAPE11         DD        DSN=FDR11, DI SP=(, KEEP) , UNI T=3480, LABEL=RETPD=1000
//SYSI N         DD        *
DUMP              TYPE=ARC, ONLI NE, DYNARC, RECALL=YES, ADAYS=60, COMPRESS=ALL
```

In this example, the COPY2 files created on TAPE11 might be sent off-site for disaster recovery. At the disaster site, to cause ABR to automatically use the off-site tapes for restores instead of the POOLDISK files, change option ARCCOPY to "2" in the FDR/ABR global option table (ISPF Panel A.I.4.4).

For on-site restores, ABR will automatically use COPY1 on POOLDISK until its expiration date (30 days) is reached, then it will automatically try to use COPY2 on tape. If the COPY2 tapes are off-site, or if you want to keep 2 copies for on-site restore after the migrated copy on disk expires use the following FDRTSEL example.

**COPY DISK  
ARCHIVES  
TO TAPE**

Use FDRTSEL to copy archive backup files on POOLDISK (COPY1) that will expire within 3 days to tape, extending their expiration to 700 days. The Archive Control File will be updated to point to the new COPY1, and the disk backup files will be scratched.

```
//FDRTSEL      EXEC      PGM=FDRTSEL, REGI ON=2048K
//SYSPRI NT      DD        SYSOUT=*
//TAPEOUT      DD        DSN=TSEL1, DI SP=(NEW, KEEP) , UNI T=TAPE,
//              LABEL=RETPD=700
//SYSI N        DD        *
MOVE            CAT=RECAT, DYNARC
SELECT          ARCHI VE, COPY=1, EXPI RE=YES, XDAYS=3
```

**CATALOG  
POOLDISK  
DATA SET**

This is an example of using IDCAMS to create a catalog entry for an ABR POOLDISK. This allows the POOLDISK to be referred to by name without having to specify the disk volumes in the ABR JCL. A DELETE is included to delete any previous definition. This is only a catalog entry, no actual data set is created.

```
//POOLCAT      EXEC      PGM=IDCAMS
//SYSPRI NT      DD        SYSOUT=*
//SYSI N        DD        *
DELETE          FDRABR. POOLDI SK. ARC1  NOSCRATCH
SET             MAXCC=0
DEFINE          NONVSAM(NAME(FDRABR. POOLDI SK. ARC1) -
DEVI CETYPE( 3390) -
VOLUMES(ARCO01 ARCO02 ARCO03))
```

**CLEAN UP  
DISK ABR  
BACKUPS**

Clean up expired ABR backup files from two POOLS of disks. ABR will search the volumes specified for data sets which meet ABR's naming conventions for backup data sets. If they have expired, ABR will SCRATCH these data sets without taking a backup. The second POOL is referenced as a cataloged data set. The IBM SCRATCH SVC is used to SCRATCH the backup data sets. This job should be run periodically if you are doing ABR ARCHIVE or backup to disk, to clean up expired files and maintain as much free space as possible on those disks.

```
//SCRATCH      EXEC      PGM=FDRABR
//SYSPRI NT      DD        SYSOUT=*
//SYSPRI N1      DD        SYSOUT=*
//TAPE1         DD        DUMMY
//DI SK1        DD        DSN=FDRABR. POOLDI SK. ARCHI VE1, DI SP=OLD,
//              VOL=SER=( ARC100, ARC101, ARC102, ARC103) , UNI T=DI SK
//DI SK2        DD        DSN=FDRABR. POOLDI SK. ARCHI VE2, DI SP=OLD
//SYSI N        DD        *
DUMP              TYPE=SCR, SCRATCH
SELECT          ABRBKUP
```



## 51.10 FDRABR ARCHIVE RESTORE EXAMPLES

**RESTORE A  
DATA SET  
GROUP**

Restore a group of data sets with the high-level index of 'USERxx'. The most recent copy of each such data set recorded in the standard ARCHIVE control file will be restored. DYNTAPE is used to allocate the backup medium. The data sets will be RESTORED to their original volumes; if any cannot be allocated on that volume, the ABR RESTORE ALLOCATION LIST, if enabled, will be used to choose alternate volumes.

```
//RESTORE      EXEC      PGM=FDRABR, REGI ON=1024K
//SYSPRI NT     DD        SYSOUT=*
//SYSUDUMP      DD        SYSOUT=*
//SYSI N        DD        *
                RESTORE    TYPE=ARC, DYNARC, DYNTAPE
                SELECT      DSN=USER%%. **
```

**RESTORE  
SELECTED  
DATA SETS**

Specified data sets are to be restored from ARCHIVE. The operator will be prompted for the tape volumes before a RESTORE is attempted on each tape. All data sets with a group name of 'MARK1.' will be restored. Also data set 'OLDFILE', which was ARCHIVED on 89.350 from disk volume SYS002, will be restored to data set 'NEWFILE' on disk volume SCRO11. The third oldest archive version of data set 'MYFILE' will be restored to volume SYS001. All of the archive backups are on 3480 cartridge, so a TAPE1 DD is provided.

```
//RESTORE      EXEC      PGM=FDRABR, REGI ON=1M
//SYSPRI NT     DD        SYSOUT=*
//SYSUDUMP      DD        SYSOUT=*
//ARCHI VE      DD        DSN=FDRABR. ARCHI VE, DI SP=SHR
//TAPE1         DD        DSN=FDRREST, VOL=SER=FDRVOL,
//              UNI T=( 3480, , DEFER) , DI SP=(OLD, KEEP)
//SYSI N        DD        *
                RESTORE    TYPE=ARC, OPERATOR
                SELECT      DSN=MARK1. **
                SELECT      DSN=OLDFI LE, VOL=SYS002, ADATE=89350,
                            NEWN=NEWFI LE, NVOL=SCRO11
                SELECT      DSN=MYFI LE, NVOL=SYS001, OLDBACKUP=2
```

**REMOTE  
QUEUE  
RESTORE**

A job similar to the following should be run several times a day if the ABR ARCHIVE RESTORE remote queue data set is used. It will process any queued requests and empty the queue so that more requests can be added. The frequency of this job must be decided by the installation, based on how long users are willing to wait for their restore request to be completed (1 hour, 4 hours, etc.).

```
//REMOTEA      EXEC      PGM=FDRABR, REGI ON=2M
//SYSPRI NT     DD        SYSOUT=*
//SYSUDUMP      DD        SYSOUT=*
//ARCHI VE      DD        DSN=FDRABR. ARCHI VE, DI SP=SHR
//SYSI N        DD        *
                RESTORE    TYPE=ARC, ONLI NE, DYNTAPE
//ABRARCH      DD        DSN=FDRABR. ABRARCH. USER, DI SP=SHR
```

CONTINUED . . .

## 51.10 CONTINUED . . .

**RESTORE BY** RESTORE all of the data sets ARCHIVEd on the date 90.123 from a 3380 volume 'PRODUC' to an  
**ARCHIVE** unlike device (3390). All but 10% of the unused space within PS and PO data sets will be released.  
**DATE** All data sets will be recataloged to the new volume.

```
//UNLI KE      EXEC      PGM=FDRABR, REGI ON=2M
//SYSPRI NT      DD      SYSOUT=*
//SYSPRI N1      DD      SYSOUT=*
//SYSUDUMP      DD      SYSOUT=*
//TAPE1          DD      DSN=FD RR, VOL=SER=FDRVOL,
//              DI SP=(OLD, KEEP), UNI T=(TAPE, , DEFER)
//SYSI N          DD      *
                RESTORE   TYPE=ARC, %FREE=10, DYNARC, RECAT, VRECAT
                SELECT    ALLDSN, NVOL=V33901, ADATE=90123, VOL=PRODUC
```

51.11 SUPERSCRATCH EXAMPLES

NOTE: any volume to be processed for SUPERSCRATCH must be enabled for SUPERSCRATCH in the ABR Model DSCB on that volume.

**SCRATCH  
UNCATALOGED  
DATA SETS**

All data sets in the installation must be cataloged, so all uncataloged data sets on TSO and PROD volumes are to be scratched if they are not properly cataloged. The IBM SCRATCH SVC will be used to scratch the data sets; any scratched data set which has a current ABR backup will be recorded in the ABR scratch catalog, so it can be recovered from its backup if required.

```
//SCRATCH      EXEC      PGM=FDRABR
//SYSPRI NT     DD        SYSOUT=*
//SYSPRI N1     DD        SYSOUT=*
//SYSUDUMP      DD        SYSOUT=*
//TAPE1         DD        DUMMY
//SYSI N        DD        *
                DUMP      TYPE=SCR, I FNOTCAT, SCRATCH=CAT
                MOUNT     VOLG=TSO
                MOUNT     VOLG=PROD
```

**CLEAN OFF  
WORK  
VOLUMES**

All WORK volumes are to be cleaned off nightly. DSNENQ=USE ensures that any data sets still in use will not be selected. TEMP will select temporary data sets; ALLDSN selects all other data sets.

```
//SCRATCH      EXEC      PGM=FDRABR
//SYSPRI NT     DD        SYSOUT=*
//SYSPRI N1     DD        SYSOUT=*
//SYSUDUMP      DD        SYSOUT=*
//TAPE1         DD        DUMMY
//SYSI N        DD        *
                DUMP      TYPE=SCR, ONLVOL, DSNENQ=USE
                SELECT     TEMP, VOLG=WORK, CRDAYS=2
                SELECT     ALLDSN, VOLG=WORK
```

## 51.12 SMS ARCHIVE EXAMPLES

ABR ARCHIVE and SUPERSCRATCH on SMS-managed volumes can be done in the same ABR step as non-SMS volumes. Selection of data sets from SMS volumes can be done by normal ABR control statements (if SMSMANAGE=NO is specified or defaulted), or by SMS management class criteria (SMSMANAGE=YES must be specified). Even if SMSMANAGE=YES, selection of data sets from SMS volumes may still be done by ABR control statements if SMSCOMMAND=YES is specified. [See Section 52.50](#) for more details. The examples below process only SMS volumes so that SMS processing can be clarified.

**SCRATCH AND  
ARCHIVE  
BASED ON  
MANAGE-  
MENT CLASS**

Since some of the characteristics of the SMS management class relate to scratching data sets, and some to archiving, a complete implementation of the SMS management class requires that a ABR SUPERSCRATCH step be run right before a ABR ARCHIVE step. This is explained in detail in [Section 52.50](#). In this example, only the management class criteria will be used to select data sets for scratch and ARCHIVE.

```
//SCRATCH      EXEC      PGM=FDRABR, REGI ON=1200K
//SYSPRI NT    DD        SYSOUT=*
//SYSPRI N1    DD        SYSOUT=*
//SYSUDUMP     DD        SYSOUT=*
//TAPE1        DD        DUMMY
//SYSI N       DD        *
                DUMP      TYPE=SCR, SMSMANAGE=YES, DSNENQ=USE, EXPI RED, SELTERR=NO
                MOUNT     STORGRP=TS01
                MOUNT     STORGRP=TS02
//ARCHI VE     EXEC      PGM=FDRABR, REGI ON=2148K, COND=(O, NE, SCRATCH)
//SYSPRI NT    DD        SYSOUT=*
//SYSPRI N1    DD        SYSOUT=*
//SYSUDUMP     DD        SYSOUT=*
//TAPE1        DD        DSN=FDRABR. POOLDI SK. SMS1, UNI T=DI SK,
//              VOL=SER=( ARCO01, ARCO02, ARCO03) , DI SP=OLD, LABEL=RETPD=30
//TAPE11       DD        DSN=SMS2, UNI T=TAPE, DI SP=( , KEEP) , LABEL=RETPD=730
//SYSI N       DD        *
                DUMP      TYPE=ARC, SMSMANAGE=YES, RECALL, DSNENQ=USE, DYNARC,
                COMPRESS=ALL
                MOUNT     STORGRP=TS01
                MOUNT     STORGRP=TS02
```

**ARCHIVE  
BASED  
ON SMS  
THRESHOLDS**

Select data sets for ARCHIVING from SMS-managed volumes based on their SMS management class criteria, but only from SMS volumes whose percentage of tracks allocated exceeds the high threshold associated with the volume's SMS storage group.

```
//ARCHI VE     EXEC      PGM=FDRABR, REGI ON=2248K
//SYSPRI NT    DD        SYSOUT=*
//SYSPRI N1    DD        SYSOUT=*
//SYSUDUMP     DD        SYSOUT=*
//TAPE1        DD        DSN=SMS1, UNI T=TAPE, DI SP=( , KEEP)
//TAPE11       DD        DSN=SMS2, UNI T=TAPE, DI SP=( , KEEP)
//SYSI N       DD        *
                DUMP      TYPE=ARC, SMSMANAGE=YES, RECALL, DSNENQ=USE, DYNARC,
                THRESHOLD=HI GH, COMPRESS=ALL
                MOUNT     STORGRP=PROD1
```

**51.20 APPLICATION BACKUP**

Application Backup is a procedure for the backup and recovery of a selected set of datasets, usually belonging to one application system. It is independent of the backup subsystem of ABR described in [Section 50](#). In fact, it uses facilities of the ARCHIVE subsystem of ABR, but it is a true backup, since it does not disturb the original disk datasets in any way.

In one step, Application Backup can back up a large number of datasets from an unlimited number of different disk volumes, creating files on one or more tapes which contain standard FDR backups of those datasets. Since datasets for Application Backup are usually selected via the system catalogs, the user does not have to be aware of the location of the datasets, or of how many disk volumes are involved; ABR will locate all the datasets and back them up automatically.

Many application jobstreams contain a series of specialized backup steps in order to create backups of application-oriented datasets to provide restart and recovery capabilities just for that application. These backups (often IEBGENER or IDCAMS REPRO steps) may be very time-consuming and may use many tapes. Application Backup may be used as a single-step high-speed replacement for those specialized backups. If Application Backup tapes are sent to offsite storage, they may also be used to recover application datasets at a disaster recovery site.

**WHY  
APPLICATION  
BACKUP?**

Why would you want to use Application Backup instead of relying on ABR incremental backups?

- \* Incremental backups are usually taken at a fixed time each night. For some applications, this is the wrong time and does not provide the recovery and restartability they need. Application Backups can be inserted into the application jobstreams, to provide point-in-time backup at a point in processing chosen by the application developers.
- \* Frequency and retention of the Application Backups can be under control of the application, instead of the Data Center.
- \* At a disaster recovery site, critical applications can be recovered first and less urgent applications at a later time.

Under SMS and other disk pooling software, users often are unaware of the disk volume serials of their datasets. Application backup allows you to provide one TAPEX DD (with optional duplicate backup TAPEXX), and to select datasets from the system catalogs without being concerned about the volumes they are on.

Application recovery uses dataset (DSF-type) restores, so the datasets may be directed to a different set of volumes than those they were dumped from, and may be spread out on fewer or more volumes than they originally occupied. Remember that multi-volume datasets must be restored to the same number of volumes they were dumped from, with the original amount of space on each.

For recovery at your own data center, this procedure is useful if a critical application must have recovery, owns data sets which reside on multiple disk volumes, and the backups cannot be scheduled as part of the normal incremental backups. The Application Backup is usually done after the BATCH or ONLINE processing for the application has completed and the data sets are quiesced. Since only data sets from this application are dumped, using all of the performance of an FDR dump, the down time for the application is reduced to a minimum. The application backup can be made a job or step in the actual application jobstream, rather than a separately scheduled job.

Innovation Application Backup (TYPE=APPL) is comparable to the IBM ABARS concept under DFHSM or DFSMSHsm. ABR's application backup:

- a. is significantly faster,
- b. will operate under both SMS and non-SMS systems and
- c. offers more flexible selection criteria.

CONTINUED . . .

## 51.20 CONTINUED . . .

**FEATURES OF  
APPLICATION  
BACKUP**

When you specify DUMP TYPE=APPL, here is what ABR will do:

- The datasets to be backed up are identified by SELECT statements, with optional EXCLUDE statements if you want to exclude certain datasets within a larger group.
- The simplest way to select them is with SELECT CATDSN=filter. ABR will select datasets by searching the system catalogs, and will automatically identify the volumes to which they are cataloged. The “filter” is a flexible mask, described in [Section 52.16](#), which will select datasets by name according to user requirements.
- You may also select datasets directly from disk volumes, bypassing the catalog, if you know which volumes or groups of volumes the datasets reside on.
- The disk volumes selected (from the catalog or specified on SELECT statements) will be automatically processed by Application Backup, as long as they are online. Unlike normal ABR processing, Application Backup does not require that the volumes be initialized for ABR or enabled for ARCHIVE. No ENQ/RESERVE will be done on the VTOC of the selected volumes, so multiple backups can run against the same volumes at the same time.
- The datasets selected will be dumped by Application Backup as they are encountered during the processing of the disks. Security checking (if security is enabled in the FDR/ABR Global Option Table) will be for READ access.
- ABR will create one or more tape backup files for each disk volume processed. These backup files are in the normal FDR/ABR format, each containing one or more datasets selected from one disk volume. The names of these backup files are controlled by ABR and will have the format shown in [Section 52.05](#), namely:  
`abrindex.Vvolser.bnyydddx`  
 “abrindex” is normally FDRABR, but if the Control File in which the backups are being recorded was initialized with the USERINDEX=YES operand or if you are creating the Control File in the Application Backup step, then the “abrindex” will be the same as the high-level index of the Control File itself. This will allow these dataset names to be more easily handled by tape management and security systems and allow them to be more easily identified as belonging to the associated application system. Although the TAPEX DD in the Application Backup JCL must have a dataset name on it because of MVS requirements, that name is ignored by ABR; all files are created with the name format shown above.
- The backup files created are normally not cataloged, except for those files which exceed 5 tape volumes. Application Backup does not require a catalog entry to restore from these backups (except for those over 5 volumes). However, if you prefer to catalog them an option is available to do so.
- The backup location (tape volser(s), file number, and backup dsname) for all the datasets selected by Application Backup will be recorded in a Control File; this is separate from the backups recorded by the full-volume and incremental backups of the ABR backup subsystem. This Control File is identical in format to the ARCHIVE Control File used by the ABR ARCHIVE subsystem.
- Application Backups will not be restored by an ABR full-volume restore.  
 A separate Application Restore must be executed for each Application Backup to be restored.

CONTINUED . . .

## 51.20 CONTINUED . . .

- If you are already doing normal ARCHIVING, you already have an ARCHIVE Control File which is used for auto-recall. However, Application Backups do not really ARCHIVE datasets and should not be recorded there. They should have their own Control File. In fact, since ABR supports an unlimited number of Control Files, you should have a unique file for each application or for each run. The name of the Control File can be almost anything that meets your naming requirements.
- The Control File used for Application Backup can be a permanent file, usually used for only one application. In this case, it must be preformatted before its first use by the FDRARCH utility.
- The Control file can also be a new file (usually a GDG) which is automatically formatted by Application Backup.
- By default, the Control File used in each Application Backup step will itself be backed up at the very end of the backup tape, making that tape entirely self-contained for recovery purposes, that is, it contains both the backups and a backup of the control file describing those backups. The name of that backup file can be specified by the user (and can be a GDG) although there is a default name if not overridden. You can bypass the backup of the Control File if you wish.

**OPTIONAL  
TECHNIQUES**

There are several different ways that you can implement Application Backup, each with its own advantages. You must choose the one that best meets your needs; the choice may depend on whether you intend to use Application Backup to recover applications at a disaster site, or at your prime site, or both.

The differences in the techniques are primarily in the usage of the Control File. Remember that ABR records the Application Backups in a Control File, and that Control File is required to restore the datasets. The two major techniques are:

- A) One permanent Control File for each application.
- B) The Control File for each application is a GDG, creating a new generation for each Application Backup STEP.

Each of these is described in more detail in [Section 51.27](#) and [51.28](#), with sample JCL for each.

**51.21 APPLICATION BACKUP JOB CONTROL REQUIREMENT**

The following Job Control Statements are required to perform Application Backup.

**JOB  
STATEMENT**

The JOB statement is user-specified and depends upon installation standards.

**EXEC  
STATEMENT**

Must specify the name of the program to be executed- FDRABR. The basic region size is 1200K for FDRABR. The storage requirement is increased by 1024K for each additional TAPEX DD statement beyond the first. If the COMPRESS option is used, add 1024K per TAPEX DD. The PARM, if specified, is used by ABR as the first control statement. If the PARM contains a slash ("/") the data after the slash will be used as the second control statement, e.g.,

```
//S1 EXEC PGM=FDRABR, PARM=' DUMP TYPE=APPL/S CATDSN=PAYROLL. **'
```

**STEPLIB/  
JOBLIB DD  
STATEMENT**

If required, must specify the load module library in which ABR resides. The library must be AUTHORIZED. Can be omitted if ABR is in the system linklist.

**SYSPRINT DD  
STATEMENT**

Specifies the output message data set. This is a required DD statement. SYSPRINT usually specifies a SYSOUT data set.

**SYSPRIN1 DD  
STATEMENT**

Specifies the secondary message data set for the DUMP operation. Usually a SYSOUT data set. If not SYSOUT, this DD must specify a disposition of MOD.

**SYSUDUMP DD  
STATEMENT**

Specifies the ABEND dump data set. Although not required, we strongly urge you to always include this DD statement so we can help you diagnose your error conditions. Usually a SYSOUT data set.

**ARCHIVE DD  
STATEMENT**

Specifies the Control File in which all datasets dumped by this Application Backup step will be recorded.

It may reference a permanent Control File (usually unique for each application) in which case entries will be accumulated from multiple Application Backup runs. Specify DISP=SHR since ABR internally serializes access. For example,

```
//ARCHIVE DD DSN=INVOICE.BACKUP.CONTROL, DISP=SHR
```

If the ARCHIVE DD references a NEW dataset, Application Backup will format it as datasets are recorded in it. Since each track of the control file can record the backups of several hundred datasets, a few tracks are usually all that is required. For example,

```
//ARCHIVE DD DSN=PAYROLL.ARCH1(+1), UNIT=DISK,  
// SPACE=(TRK, (3, 1), RLSE), DISP=(, CATLG)
```

If ARCBACKUP=DSF is in effect, and ARCBIDSN (and ARCB2DSN, if applicable) are not specified, then the dsname of the Control File must include the index level 'ARCHIVE'.

On SIMULATION runs, this DD statement is not required.

CONTINUED . . .



## 51.21 CONTINUED . . .

**TAPE1 DD  
STATEMENT**

Specifies the COPY 1 backup tape to be used for Application Backup. If data sets from multiple disk volumes are dumped, ABR will create multiple files on the tape (or tape aggregate if more than one tape volume is used), one file for each disk volume.

Usually only TAPE1 is required for Application Backup, and ABR will process disk volumes one at a time. If a large amount of data from multiple disks is to be dumped, you may specify additional TAPEx DDs and ABR will process up to 10 disks in parallel (however, region requirements may limit the number of concurrent subtasks; see the EXEC statement in this section). There must be a SYSPRINx DD and optionally a TAPExx DD matching each TAPEx DD. Do not specify DSNENQ= if multi-volume datasets might be involved.

On each TAPE DD you should specify:

DSN= — a dsname is required by MVS, but it will be overridden by ABR at OPEN time, so any non-temporary name is acceptable. However, MVS will do an exclusive ENQ on this name so each Application Backup job should use unique names. The same name can be used on each TAPE DD in a step without harm.

UNIT= — specify a generic (e.g., 3490) or esoteric (e.g., CART) name to allocate the type of tape drive desired. If you have sufficient tape drives available, specifying a unit count of 2 (e.g., UNIT=(3490,2)) may reduce elapsed time.

DISP=(NEW,KEEP) — do not specify CATLG since ABR handles cataloging of output files internally.

VOL — specify a volume count (e.g., VOL=(,,255)) to prevent ABR from ABENDING if more than 5 tape volumes are required. If no volume serials are specified, ABR will call for scratch tapes; this is recommended; however, you may specify up to 255 tape volume serials.

LABEL= — you may want to specify RETPD=nnnn or EXPDT=yyddd to specify the expiration date of the Application backup (retention period may also be specified on the DUMP statement). ABR will record the expiration date of this backup copy in the Control File for each dataset selected. If you have a tape management system it may honor the expiration specified (see [Sections 52.06](#) and [52.12](#) for details).

**EXAMPLE:**

```
//TAPE1      DD   DSN=PAYROLL. BACK1, UNI T=3490, DI SP=(NEW, KEEP) ,
//           VOL=( , , , 255) , LABEL=RETPD=21
```

WARNING: Tapes created by ABR cannot be copied using normal copy programs. Use the INNOVATION provided program (FDRTCOPY) to copy ABR tapes.

On SIMULATION runs, TAPE1 must specify DD DUMMY.

**TAPE11 DD STATEMENT**

This optional DD specifies that ABR is to create a duplicate backup tape called COPY 2. This copy can be sent offsite for disaster recovery. TAPE11 does not increase the REGION requirements.

**EXAMPLE:**

```
//TAPE11     DD   DSN=PAYROLL. BACK1, UNI T=3490, DI SP=(NEW, KEEP) ,
//           VOL=( , , , 255) , LABEL=RETPD=21
```

will produce a tape which is a duplicate of the backups on the TAPE1 DD shown above. The copy number in the dataset names created will be 2 ([See Section 52.05](#)).

**SYSIN DD  
STATEMENTS**

Specifies the control statement data set. Required for all ABR functions. Usually an input stream or DD \* data set.

## 51.22 APPLICATION BACKUP DUMP COMMAND

**DUMP** *TYPE=APPL*  
**D**  
**SIM** *,ARCBACKUP=DSF / NO*  
*,ARCB1DSN=dsname*  
*,ARCB2DSN=dsname*  
*,ARCCAT=ALL / NO / NORMAL*  
*,COMPRESS=ALL / COPY1 / COPY2*  
*,DSNENQ=NONE / TEST / USE / HAVE*  
*,ENQERR=NO*  
*,ENQERR=BYPASS / PROCESS*  
*,MAXCARDS=nnnnn*  
*,RETPD=dddd*  
*,SELTERR=NO / YES*

There are some additional operands that can be specified on a DUMP TYPE=APPL statement, but they are rarely used with Application Backup. Their definitions can be found in [Section 51.03](#). They are:

<b>CATBYPERR</b>	<b>DATA=</b>	<b>ICFCORE=</b>
<b>LBPZERO=</b>	<b>MAXBTRKS=</b>	<b>MAXDD=</b>
<b>MAXERR=</b>	<b>MAXFILE=</b>	<b>PRINT=ABR</b>

**DUMP COMMAND** The DUMP TYPE=APPL command invokes Application Backup. Only one DUMP statement is allowed per execution of ABR.

**SIM COMMAND** If SIM is specified, ABR will perform the Application Backup in simulation mode. The TAPE1 DD statement must specify DD DUMMY, and no Control File will be created or written. ABR will produce a report in PRINT VTOC format showing the data sets that would be backed up. The main purpose of simulation is to check that the right data sets are being selected.

**OPERANDS** **ARCBACKUP=** **DSF** — specifies that ABR is to backup the Control File used to record the backups for this Application Backup as the last file on the backup tapes. If the ARCB1DSN= and/or ARCB2DSN= operands are specified, those dsnames will be used for the tape file name of this backup (on TAPE1 and TAPE11 respectively). If those operands are omitted, then the name is formed by taking the name of the Control File itself and changing the index level of ARCHIVE to ARCBKUP (for TAPE1) and ARCBKU2 (for TAPE11).

**NO** — specifies that ABR is not to backup the Control File. ARCBACKUP=NO should be specified only when you are using other means to backup and recover the Application Control Files, or when the Application Backup is to be used only for onsite recovery and never at a disaster site.

Default is DSF.

**ARCB1DSN=**  
**ARCB2DSN=** Specifies the data set name to be used for the backup of the Control File as the last file on the Application Backup tapes. This backup will be done automatically unless ARCBACKUP=NO is specified. ARCB1DSN specifies the tape file name to be used on TAPE1, and ARCB2DSN on TAPE11. These names may be any valid MVS dsname, including a GDG relative generation, e.g., ARCB1DSN=PAYROLL.APPL.BACKUP(+1).  
 These data sets will always be cataloged internally.

CONTINUED . . .

## 51.22 CONTINUED . . .

- ARCCAT=** Specifies how ABR is to handle cataloging of the tape files created by Application Backup.
- ALL** — all the files will be cataloged.
- NO** — no files will be cataloged, except for any backup file that exceeds 5 tape volumes, and the backup of the Control File (see ARCBACKUP=).
- NORMAL** — files will be cataloged by the rules used for normal ARCHIVE (it will catalog the backup file anytime the volume list changes from the previous file created, which includes the first file created, any file that requires a new output tape, and the first file created on a new output tape). However, ARCCAT=NORMAL is treated the same as ARCCAT=ALL for the TAPE1 or TAPE11 DD if EXPDT=99000 (tape management catalog control) is specified on the DD.
- Default is NO.
- COMPRESS=** **ALL** — specifies that ABR is to compress the output data on the backup file for both copies (TAPE1 and TAPE11).
- COPY1** — specifies that only the data on the TAPE1 DD statement will be compressed.
- COPY2** — specifies that only the data on the TAPE11 DD statement will be compressed.
- Default is that the backup files will not be compressed.
- DSNENQ=** Specifies that ABR is to enqueue all of the data sets being backed up, to see if they are in use by another job and to prevent them from being used while ABR is backing them up. ABR will issue an exclusive enqueue with a major name of 'SYSDSN' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails:
- \* an FDR158 warning message will be issued
  - \* the failing dataset will still be backed up unless ENQERR=BYPASS is specified; the validity of the backup is questionable if the other job is updating the dataset.
  - \* the ABR step will end with condition code 12 unless ENQERR=NO is specified.
- TEST** — The data sets will only be tested to see if they are active at the time the dump starts. The data set will not be enqueued.
- USE** — The data sets will be enqueued for the duration of the DUMP. If not available, only a warning message is issued and the data set will not be enqueued.
- HAVE** — The data sets will be enqueued for the duration of the DUMP. If not available, ABR will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. IF WAIT is specified, ABR will wait for the data set to become available. The job could time out. If NOWAIT is specified, ABR will print a warning message for the data set and will not issue the enqueue. If RETRY is specified, ABR will attempt the enqueue again.
- NONE** — This is the default. No data set ENQ will be issued.
- NOTE: If the data set is specified in a DD statement in the ABR job with DISP=SHR, ABR will change the scheduler enqueue for the data set to EXCLUSIVE (DISP=OLD) if the user specifies TEST, USE or HAVE. The operator cannot respond WAIT to the message issued by DSNENQ=HAVE if this enqueue cannot be changed from SHARE to EXCLUSIVE.
- DSNENQ= should not be specified if you have multiple TAPEX DD statements, to DUMP multiple disk volumes concurrently, and multi-volume datasets may be involved.

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## 51.22 CONTINUED . . .

- ENQERR=** **NO** — specifies that ABR will not set a non-zero condition code or ABEND at the end of the ABR execution if the DSNENQ= option is used and a data set is found to be active. Specify ENQERR=NO and DSNENQ= if you want to get messages about active datasets but want the step to end normally.
- Default is that ABR will issue a non-zero condition code or ABEND when a dataset is found to be active.
- ENQERR=** **BYPASS** — specifies that ABR is not to back up a data set if the DSNENQ= option is used and the data set is found to be active.
- PROCESS** — specifies that ABR is to back up a data set even if the DSNENQ= option found it to be active (a warning message will still be produced).
- Default is PROCESS.
- NOTE: both ENQERR=NO and ENQERR=BYPASS/PROCESS may be specified on the same DUMP statement.
- MAXCARDS=** Specifies the total number of SELECT and EXCLUDE commands that can be accepted. If SELECT CATDSN= is used, an internal SELECT is generated for each dataset/volume combination selected from the catalog, so MAXCARDS= may need to be specified if a large number of datasets are selected.
- Default is 100 commands/datasets.
- RETPD=** Specifies the number of days the Application Backup tapes will be kept. Applies to all TAPE DDs in the step. It will override any RETPD or EXPDT values on those TAPE DDs.
- Default is 365 days, unless overridden by the ARCRETPD option in the FDR/ABR Global Option Table ([See Section 91 or 92](#)), or by RETPD= or EXPDT= on individual TAPE DD statements.
- SELTERR=** **YES** — specifies that ABR will set a condition code at the end of the DUMP if any SELECT/EXCLUDE statement did not match any data set on any input disk, i.e., the dataset specified was not found. For SELECT CATDSN= this will occur if the filter did not match any data sets in the catalog, or for any dataset that was cataloged but not found on the disk.
- NO** — specifies that ABR is not to set a condition code if a SELECT or EXCLUDE did not match.
- Default is YES unless overridden in the FDR/ABR global option table ([See Section 91 or 92](#)).

## 51.23 SELECT COMMAND for APPLICATION BACKUP

```

SELECT  DSN=filter | CATDSN=filter | ALLDSN
      S  ,CATLIMITGDG=n
EXCLUDE ,DATA=NONE
      X  ,DSORG=(xx,xx..)
        ,GDG
        ,VOL=vvvvvvv, | VOLG=vvvvv

```

There are some additional operands that can be specified on a SELECT command, but they are rarely used with Application Backup. Their definitions can be found in [Section 51.04](#). They are:

CATALOG=	MCATALOG=
CATBYPERR	PRTALIAS
CRDAYS=dddd	UPDATE
DATA=ALL	

<b>SELECT COMMAND</b>	The SELECT Command specifies the datasets to be dumped by Application Backup. SELECT CATDSN= will scan the system catalogs for the specified data sets and then scan the volumes found in the catalog to back up those datasets. SELECT DSN= or ALLDSN should also specify VOL= or VOLG= to specify the volumes to be searched. If other operands are specified (such as CRDAYS= or GDG), the dataset will be backed up only if it meets those criteria.
<b>EXCLUDE COMMAND</b>	The EXCLUDE command can be used to exclude certain datasets from a more encompassing SELECT. Since datasets are compared to the commands in the order specified, EXCLUDEs should usually precede SELECTs.
<b>ICF VSAM CLUSTERS</b>	ICF VSAM clusters can be selected by ABR only by the base cluster name with the DSN= or CATDSN= operand. If selected, ABR will back up all of the components associated with this cluster which exist on the volumes processed. This includes alternate indexes and key range components. The component names will be reported by ABR followed by the base cluster name. ABR will dump to the backup file all of the associated VVR records found in the 'SYS1.VVDS' data set. For further information, <a href="#">See Section 52.11</a> , VSAM SPECIAL CONSIDERATIONS.

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## 51.23 CONTINUED . . .

<b>OPERANDS</b>	<b>DSN=</b>	<p>Specifies a fully-qualified data set name or a filter to be used for generic data set selection, as described in <a href="#">Section 52.16</a>. This name or filter will be used when scanning the VTOCs of selected volumes. VOL= or VOLG= should also be specified.</p> <p>EXAMPLES:     DSN=I NVENTORY. WI DGET. WAREHOUS                         DSN=CLAI MS. * *                         DSN=PROD++ . * * . LI B *</p> <p>DSN= does not have any special support for selecting GDGs. However, if it is used in conjunction with the GDG operand then only GDGs will be selected.</p>
	<b>CATDSN=</b>	<p>Specifies a fully-qualified data set name or a filter to be used for generic data set selection from system catalogs, as described in <a href="#">Section 52.16</a>.</p> <p>If a fully-qualified name is specified, that name will be located in the system catalogs, and the volume serial(s) from the catalog become an implied VOL= parameter. Specification of a relative generation number for GDG data sets is supported (e.g., CATDSN=A.B(-1)).</p> <p>If a filter is specified, then catalogs will be scanned for all cataloged data sets matching the filter, and they will be processed as if a SELECT CATDSN=dsname was present for each of them. It may be necessary to specify MAXCARDS=nnnnn on the DUMP command if a large number of data sets are selected by the filter. Additional considerations for CATDSN=filter are explained in <a href="#">Section 52.16</a>.</p> <p>CATDSN= is supported only on SELECT statements (not on EXCLUDE).</p> <p>If the VOL/VOLG= operand is also specified on a SELECT statement with CATDSN=, then only data sets cataloged to those volumes will be selected.</p> <p>EXAMPLES:     CATDSN=I NVENTORY. WI DGET. WAREHOUS                         CATDSN=CLAI MS. * * ( O)                         CATDSN=PROD++ . * * . LI B *</p> <p>Normally CATDSN= will not display the data sets it selects from the catalogs; you will see the names only when ABR actually finds and selects the data sets in the VTOCs of the volumes to which they are cataloged. To display all of the data sets selected specify PCATDSN=filter.</p>
	<b>ALLDSN</b>	<p>Specifies that all the data sets encountered on the volumes specified by VOL= or VOLG= are to be SELECTed or EXCLUDEd. DSN=** is equivalent to ALLDSN.</p> <p>NOTE: DSN=, CATDSN= and ALLDSN are mutually exclusive. One and only one of them must be specified on each SELECT/EXCLUDE command.</p>
	<b>CATLIMITGDG=</b>	<p>May be used with CATDSN=filter to limit the selection of GDGs from the catalogs. It will not affect the selection of cataloged non-GDG data sets, but if the filter selects a GDG then:</p> <p><b>n</b> will cause only the most recently created “n” generations to be selected.</p> <p>– <b>n</b> will cause only generation (– n) to be selected.</p> <p>Default is that all the generations of GDGs whose base name matches the filter will be selected unless a relative generation number is specified at the end of the filter, e.g., CATDSN=filter(– 2).</p>

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## 51.23 CONTINUED . . .

<b>DATA=</b>	<b>NONE</b> — specifies that ABR will dump allocation information about the selected data sets, but will not actually back up any data tracks. Can be used when the data sets are to be allocated by ABR but the contents of the data sets will be recreated by another means. DATA=NONE must also be specified when restoring data sets that were dumped with DATA=NONE.								
<b>DSORG=</b>	<p>Specifies that the data sets is not to be selected unless its DSORG matches one of the DSORGs specified. If more than one DSORG is specified, they must be enclosed in parentheses.</p> <p>VALID DSORGS are:</p> <table><tr><td>DA — BDAM</td><td>UN — UNDEFINED</td></tr><tr><td>EF — ICF VSAM</td><td>IS — ISAM</td></tr><tr><td>PS — SEQUENTIAL</td><td>UM — UNMOVABLE</td></tr><tr><td>AM — ALL VSAM</td><td>PO — PARTITIONED</td></tr></table>	DA — BDAM	UN — UNDEFINED	EF — ICF VSAM	IS — ISAM	PS — SEQUENTIAL	UM — UNMOVABLE	AM — ALL VSAM	PO — PARTITIONED
DA — BDAM	UN — UNDEFINED								
EF — ICF VSAM	IS — ISAM								
PS — SEQUENTIAL	UM — UNMOVABLE								
AM — ALL VSAM	PO — PARTITIONED								
<b>GDG</b>	Specify that the data set is not to be selected unless it is part of a generation data group.								
<b>VOL=</b>	Specifies a volume serial number. This SELECT/EXCLUDE will apply only to the volume specified.								
<b>VOLG=</b>	Specifies a group of volume serials to which this SELECT/EXCLUDE will apply. Any online disk volume serial starting with the 1 to 5 characters specified will be searched for the data set.								

**51.24 APPLICATION RESTORE JOB CONTROL REQUIREMENTS**

The following Job Control Statements are necessary to perform RESTORE from Application Backup.

**JOB  
STATEMENT**

The JOB statement is user-specified and depends upon installation standards.

**EXEC  
STATEMENT**

Must specify the name of the program to be executed — FDRABR. The basic region size is 1024K. However, some restore options, especially logical restore, may increase the region requirement. If a PARM= is specified, it is used by ABR as the first control statement. If the PARM contains a slash ("/") the data after the slash will be used as the second control statement, e.g.,

```
//STEP EXEC PGM=FDRABR, PARM=' RESTORE TYPE=APPL/S ALLDSN'
```

**STEPLIB/  
JOBLIB DD  
STATEMENT**

If required, must specify the load module library in which ABR resides. The library must be AUTHORIZED. Can be omitted if ABR is in the system linklist.

**SYSPRINT DD  
STATEMENT**

Specifies the output message data set. This is a required DD statement. SYSPRINT usually specifies a SYSOUT data set.

**SYSUDUMP DD  
STATEMENT**

Specifies the ABEND dump data set. Although not required, we strongly urge you to always include this DD statement so we can help you diagnose your error conditions. Usually a SYSOUT data set.

**ARCHIVE DD  
STATEMENT**

Specifies the Control File in which all the Application Backup datasets to be restored were recorded. If you are restoring at a disaster/recovery site, you may need to restore this Control File before you can restore the datasets. If the Control File was dumped to the Application Backup tape by the ARCBACKUP=DSF option, example JCL to restore it is shown in [Section 51.27](#). You might also be recovering it by other means (such as ABR full-volume recovery).

**TAPE1 DD  
STATEMENT**

Optionally specifies a tape drive to be used for mounting tapes for the RESTORE operation. If the DYN TAPE or DYN TAPE2 option is specified on the RESTORE statement, the TAPE1 DD will not be used and should be omitted; ABR will dynamically allocate a drive of the proper type using DD name TAPE#. DYN TAPE or DYN TAPE2 is recommended over TAPE DD statements.

If DYN TAPE OR DYN TAPE2 is not used, the TAPE1 DD must specify a drive capable of reading the type of restore tape or cartridge used. ABR will internally set the dsname, volume serial(s) and file number before OPEN, but to satisfy MVS allocation you must specify operands similar to:

```
//TAPE1 DD DSN=FDR, VOL=SER=FDROO1,  
// UNI T=(3480, , DEFER) , DI SP=(OLD, KEEP)
```

However, MVS will ENQ on the DSN and volser specified, so they should be unique in every Application Restore jobstream so that the jobs may run concurrently.

SIMULATION: If SIMREST is coded, and DYN TAPE or DYN TAPE2 is not specified, the TAPE1 DD should specify DUMMY.

**SYSDIN DD  
STATEMENT**

Specifies the control statement data set. Required for all ABR functions. Usually an input stream or DD \* data set.



## 51.25 APPLICATION RESTORE COMMAND

```

RESTORE  TYPE=APPL
R        ,BLKF=nn

SIMRES   ,COPY=n
T        ,DSNENQ=NONE / TEST / USE / HAVE
        ,DYNTAPE | ,DYNTAPE2
        ,ICFCAT=ORIGINAL / STEPCAT / ALIAS / MAXCARDS=nnnn
        ,NOCAT,RECAT
        ,PRESTAGE
        ,SELTERR=NO / YES
        ,MSGDG=DEFERRED / ACTIVE / ROLLEDOFF / INPUT
        ,VRECAT

```

There are some additional operands that can be specified on a RESTORE command, but they are rarely used with Application Backup. Their definitions can be found in [Section 51.06](#).

They are:

%FREE=	ALLOCATELIST=	BYPASSACS
BYPASSSMS	CATIFALLOC	DATA=
OPERATOR	RLSE	

**RESTORE COMMAND** The RESTORE TYPE=APPL command invokes a restore from an Application Backup. Only one RESTORE statement is allowed per execution of ABR, but any or all of the data sets for the application can be restored in one ABR step. The ARCHIVE DD statement points to a Control File which contains the records of datasets that were dumped with Application Backup.

**SIMREST COMMAND** If SIMREST is specified, ABR will print the data set names that will be selected and the tape volumes necessary to do the restore. A restore operation is not done. SIMREST can be used to pre-pull the required tapes, or to verify that the expected data sets will be restored.

**APPLICATION RESTORE PROCEDURE** If the datasets being restored already exist on the selected target disk, the restore will simply overlay them with the data from the backup tape (unless PRESTAGE is specified), so there is no need to delete the datasets before restoring them. If you are restoring at your home site, the restore will simply refresh the contents of the datasets. If they do not exist, the restore will allocate and catalog them before restoring them.

The rules for selection of a target volume for each dataset are detailed in [Section 51.06](#), but briefly these tests are done in this order:

- \* An NVOL = operand on the SELECT statement specifies one or more target volumes.
- \* If the output dataset is cataloged, ABR assumes it must exist there and uses that volume as the target.
- \* The original volume serial of the data set will be used.
- \* The installation may specify a global RESTORE ALLOCATION LIST which provides target volume serials based on dataset name and/or original volume serial.
- \* If the dataset is not on the first target volume, SMS may override ABR's choice of target volume.

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## 51.25 CONTINUED . . .

**ALTERNATE  
DEVICE  
SUPPORT**

Application Restore can restore data sets to a new device type.

A restore to different models of the same device type is a “like” device (physical) restore, treated the same as a restore to the original device and model, as long as the output volume has sufficient space to hold the data sets being restored. For example, a data set backed up from any 3380 can be restored to any 3380 single, double (3380-E) or triple (3380-K) density disk, or any 3390 in 3380 compatibility mode; any 3390 native mode data set can be restored to any other density 3390. A given dataset must be restored to the same number of volumes it was dumped from.

ABR can also restore data sets that were backed up from one device type to a totally different type of disk (an “unlike” device) using a logical restore. For example, data sets can be restored from a backup of a 3380 (any model) to a 3390 (any model). Data sets can be restored from one backup file to both like and unlike devices concurrently. The logical restore occurs automatically when ABR detects the different device type or when reblocking is requested. The logical restore is from the normal ABR physical backup tape; no special logical dump is required.

Details on how physical and logical restore handle each type of data set are in [Section 52.15](#). More detail on restore to different device types is in [Section 52.14](#).

**OPERANDS BLKF=**

Specifies that ABR is to reblock PS fixed and variable format and PO data sets. Except when restoring a PS file to a smaller disk the blocking factor must result in a larger blocksize, otherwise it will be ignored. On partitioned data sets, ABR will set the blocksize to a higher value, but will not actually reblock the members. BLKF= specifies a value of 1 to 10. 1 is full track blocking (max 32760), 2 half track, to 10 for a tenth of a track blocking. On fixed files ABR will round down to a multiple of the LRECL.

Default is that ABR will not reblock data sets. The restore will fail if the input data set has blocks larger than the track size of the output disk.

**COPY=**

Specifies the copy of the backup from which the restore is to be attempted. COPY=2 can be specified if a duplicate tape copy (TAPExx) was created during the backup, or by FDRTCOPY.

Default is COPY=1 unless COPY1 was not created or has expired, then COPY2 is the default if it exists. The default can be made COPY=2 in the FDR/ABR Global Option table ([See Sections 91 or 92](#)).

**DSNENQ=**

Specifies that ABR is to enqueue all of the data sets being restored. ABR will issue an exclusive enqueue with a major name of 'SYSDSN' and a minor name of the data set name. This is the enqueue used by the job scheduler. If the enqueue fails, ABR will issue a warning message for the data set. The data set will not be restored. A condition code will be set at the end of the ABR execution unless ENQERR=NO is specified. ABR will not enqueue on data sets which it has allocated.

**TEST** — The data sets will only be tested to see if they are active at the time the restore starts. The data set will not be enqueued.

**USE** — The data sets will be enqueued for the duration of the restore. If not available, the data set will not be restored.

**HAVE** — The data sets will be enqueued for the duration of the restore. If not available, ABR will issue a message (FDRW27) to the operator. The operator can respond WAIT, NOWAIT or RETRY to the message. If WAIT is specified, ABR will wait for the data set to become available. The job could time out. If NOWAIT is specified, ABR will print a warning message for the data set and will not restore the data set. If RETRY is specified, ABR will attempt the enqueue again.

**NONE** — No data set ENQ will be issued.

For additional details, see [Section 51.06](#).

Default is TEST.

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## 51.25 CONTINUED . . .

**DYNTAPE  
DYNTAPE2**

Specifies that ABR is to dynamically allocate the backup tape, using a DDNAME of TAPE#. This is recommended for Application Restore. DYNTAPE2 will allocate 2 drives; this should be used only if the Application Backup used more than one tape volume, and if you have sufficient available drives.

Default is that ABR will use the TAPE1 DD statement to mount tapes.

**ICFCAT=**

ICF VSAM files only. Specifies the source of the catalog name to be used by ABR if an output ICF VSAM cluster is to be allocated.

**ORIGINAL** — on a restore to the same name, specifies that ABR is to use the catalog in which the original dumped cluster was cataloged.

On a restore to a new name, ICFCAT=ORIGINAL is ignored, and ICFCAT=ALIAS normally is used. If it is desired to catalog the output cluster into the same catalog as the input cluster, the user must specify ICFCAT=STPCAT, and must supply a STEPCAT DD statement pointing to that catalog.

**STPCAT** — specifies that ABR is to use the STEPCAT as the catalog. If a STEPCAT DD statement is not supplied, ABR will use the master catalog or the catalog which is aliased for this data set in the master catalog.

**ALIAS** — specifies that ABR is to determine the catalog from the alias name in the master catalog. If no alias is found, and the cluster is being restored to the same name, ABR will use the input cluster's catalog. If no alias is found, and the cluster is being restored to a new name, ABR will use the STEPCAT (if present in the JCL) or the master catalog. Multi-level alias is supported.

Default: ORIGINAL, except that if the cluster is being restored to a newname (NEWGROUP or NEWINDEX specified) the default is ALIAS. If the output cluster is SMS-managed, ALIAS is forced.

ICFCAT might be needed if an Application Backup is restored on an existing system with a different catalog structure.

**MAXCARDS=**

Enables ABR to accept additional SELECT and EXCLUDE Commands during this execution.

Default is a maximum of 100 SELECT and EXCLUDE Commands.

**NOCAT  
RECAT**

**NOCAT** specifies that ABR will not catalog any output data sets. This option is ignored for ICF VSAM clusters and SMS-managed data sets, since these must always be cataloged.

**RECAT** specifies that ABR should catalog non-VSAM output data sets even if they are currently cataloged to another volume.

Default: ABR will catalog output non-VSAM data sets unless they are currently cataloged to another volume. Allocation of SMS-managed data sets will fail if they cannot be cataloged.

NOTE: NOCAT and RECAT are mutually exclusive. ABR will normally only attempt to catalog output data sets which it allocates (not pre-allocated) unless the CATIFALLOC operand is specified.

RECAT is recommended for Application Restore so that the catalog is updated if they must be restored to a new volume.

**PRESTAGE**

Specifies that ABR is not to restore a data set if the output data set already exists on the first output volume selected. This may be used to avoid restoring data sets which have already been restored.

Default is that ABR will restore to pre-allocated data sets, overlaying the existing contents of those data sets. If the data sets do not exist, they will be allocated.

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## 51.25 CONTINUED . . .

<b>SELTERR=</b>	<p><b>NO</b> — specifies that ABR is not to set a condition code if a SELECT statement is not referenced.</p> <p><b>YES</b> — specifies that ABR will set a condition code at the end of the RESTORE if any SELECT/EXCLUDE statement specified a data set which could not be found.</p> <p>Default is YES unless overridden in the FDR/ABR global option table (<a href="#">See Section 91 or 92</a>).</p>
<b>SMSGDG=</b>	<p>Specifies the status of SMS-managed GDG (Generation Data Group) data sets, if allocated by ABR.</p> <p><b>DEFERRED</b>, <b>ACTIVE</b>, or <b>ROLLEDOUT</b> will set the GDG to that status.</p> <p><b>INPUT</b> will set the GDG to the original SMS status of the GDG generation, as recorded on the backup tape. If the original GDG was non-SMS, it will be set ACTIVE if that generation is currently cataloged, otherwise DEFERRED.</p> <p>Default is INPUT.</p>
<b>VRECAT</b>	<p>Allows ICF VSAM clusters to be allocated and cataloged even if they already exist in the target ICF catalog. If the output cluster does not exist on the output volume selected, but the cluster name is in the catalog, the cataloged cluster will be scratched (by DELETE or, if that fails, DELETE NOSCRATCH).</p> <p>VRECAT is useful when restoring a cluster when its catalog has been restored, but the cluster on disk has not, or when restoring a cluster to a new volume. VRECAT is ignored for ICF catalogs and when the restore does not include the base data component.</p> <p>Default is that ICF VSAM clusters cannot be allocated if the cluster name already exists in the catalog (even if the catalog points to the output volume).</p> <p><b>WARNING: VRECAT will DELETE the original cluster, with all its components, alternate indexes and PATHs, from the catalog and disks. If the DELETE fails for some reason, the DELETE NOSCRATCH may leave uncataloged components on disk.</b></p> <p>VRECAT is recommended for Application Restore so that VSAM clusters can be restored to a new volume.</p>

## 51.26 SELECT COMMAND FOR APPLICATION RESTORE

```

SELECT  DSN=filter / ALLDSN
S      ,ADATE=yyddd
EXCLUDE ,BLKF=nn
X      ,COPY=n
        ,DATA=NONE
        ,NVOL=(vvvvvvv,vvvvvv,...)
        ,OLDBACKUP=mm
        ,PRESTAGE
        ,VOL=vvvvvvv

```

There are some additional operands that can be specified on a SELECT command, but they are rarely used with Application Backup. Their definitions can be found in [Section 51.07](#). They are:

%FREE=	CYL=	DATA=ALL
DATACLAS=	DSNENQ=	MGMTCLAS=
NEWNAME=	NEWGROUP=	NEWINDEX=
NOCAT	NULLDATACLAS	NULLMGMTCLAS
NULLSTORCLAS	RECAT	RLSE
STORCLAS=	TRK=	VRECAT

# SELECT/ EXCLUDE COMMANDS

These control statements select the data sets to be restored from Application backups. The SELECT command identifies the individual data set name or group of data sets to be processed. The EXCLUDE command identifies data sets from within those selected by SELECT statements which are not to be processed. ABR will select the backups of the selected data sets using information in the Control File, locate the indicated backup on tape, and restore it.

EXCLUDE statements should only contain the operands DSN=, or ALLDSN, and optionally VOL=.

**The control statements are always scanned in the order in which they were input, so in general, EXCLUDE statements should precede SELECT statements.** Since ABR will only restore data sets which are selected, EXCLUDE statements are required only to exclude certain data sets from within a larger group on a SELECT statement.

Example 1. Select all data sets with a first index of "A" except those with a second index of "B":

```

EXCLUDE DSN=A. B. * *
SELECT  DSN=A. * *

```

Example 2: Select all data sets backed up from volume TSO001 except those beginning with "ABC":

```

EXCLUDE DSN=ABC * *
SELECT  ALLDSN, VOL=TSO001

```

**NOTE:** If duplicate data set names are found on the Control File, ABR will only select the most recently dumped data set unless ADATE=, OLDBACKUP= and/or VOL= is specified.

Application Backup usually restore all the data sets recorded for the application in its Control File using SELECT ALLDSN but selective restores can be done if required.

CONTINUED . . .

## 51.26 CONTINUED . . .

<b>OPERANDS</b>	<b>DSN=</b>	<p>Specifies a fully-qualified data set or a filter to be used for generic data set selection, as described in <a href="#">Section 52.16</a>. This name or filter will be used when scanning the Control File.</p> <p>EXAMPLES:    I NVENTORY. WI DGET. WAREHOUS                         DSN=CLAI MS.   * *                         DSN=PROD++ . * * . LI B*</p>
	<b>ALLDSN</b>	<p>Requests that all datasets in the Control File should be restored. If you are using a permanent Control File, this will restore the most recent copy of every dataset recorded unless ADATE=, OLDBACKUP=, or VOL= is also specified.</p>
	<b>ADATE=</b>	<p>Only data sets which were backed up on the Julian date specified (yyddd) will be selected. Used to qualify a data set if the same data set name was dumped multiple times using a permanent Control File.</p> <p>If the dataset was dumped multiple times on the same day, OLDBACKUP= may also be specified to indicate which version to restore.</p> <p>By default, the most recent copy of each dataset found in the Control File will be restored.</p>
	<b>BLKF=</b>	<p>Specifies that ABR is to reblock PS fixed and variable and PO data sets. See BLKF= in <a href="#">Section 51.25</a> for details.</p> <p>Default is that ABR will not reblock data sets unless BLKF= was specified on the RESTORE statement. The restore will fail if the input data set has blocks larger than the track size of the output disk.</p>
	<b>COPY=</b>	<p>Specifies the copy of the backup from which the restore is to be attempted. COPY=2 can only be specified if a duplicate tape copy was created during the Application Backup or by FDRTCOPY.</p> <p>Default is COPY=1 unless COPY1 was not created or has expired, then COPY2 is the default if it exists. The default can be made COPY2 in the FDR/ABR Global Option table (<a href="#">See Section 91 or 92</a>) or by COPY=2 on the RESTORE statement.</p>
	<b>DATA=</b>	<p><b>NONE</b> — specifies that ABR will allocate the datasets selected by this SELECT statement, but will not restore any of their data tracks. Can be used when the contents of the datasets will be recreated by another means. DATA=NONE must be specified for datasets that were dumped with DATA=NONE.</p>

CONTINUED . . .

## 51.26 CONTINUED . . .

<b>NVOL=</b>	<p>Specifies the volume serials for output disk volumes to which data sets selected by this statement are to be restored. A single volume serial may be specified as NVOL=volser or multiple volume serials may be specified:</p> <ol style="list-style-type: none"> <li>1) A list of volume serials may be given, enclosed in parentheses, e.g.,            NVOL=(TSO001,TSO002,TSO003)</li> <li>2) A volume group may be specified by placing an asterisk at the end of the volume serial prefix, e.g.,            NVOL=TSO*</li> <li>3) The two may be combined, e.g.,            NVOL=(TSO*,PROD*,ABC001)</li> <li>4) All online disk volumes may be selected            NVOL=*</li> </ol> <p>Volume serials which are not online will be ignored. ABR will attempt to allocate the output data sets on the first volume specified. If an allocation fails, it will be retried on the next volume in the list (in ascending device address order) until it succeeds (or until it fails on 64 volumes). If the list contains several disk device types, "like" volumes (same type as the data set being restored) will be tried first, then unlike devices.</p> <p>Specifying multiple volume serials or a group allows ABR to restore data sets in one pass even when no one volume has available space to contain them all.</p> <p>Default is that the output volume will be selected by rules summarized in <a href="#">Section 51.25</a> and detailed in <a href="#">Section 51.06</a>. Note that when NVOL= is specified, and data sets are selected which are currently allocated and cataloged, ABR will restore them to the new volumes, and not to the volume on which they are cataloged.</p> <p>On a system with SMS active, NVOL= may be ignored if the data set does not exist on the volume specified and the data set is SMS-managed (see STORCLAS= in <a href="#">Section 51.07</a>).</p> <p>When restoring Application Backup, at your home site, NVOL= should normally be omitted so that ABR can restore over the existing allocations of the datasets on whatever volume they are currently cataloged. At a disaster site, NVOL= or the ABR RESTORE ALLOCATION LIST (<a href="#">See Section 91.05</a>) can be used to specify new volumes.</p>
<b>OLDBACKUP=</b>	<p>If you are using a permanent Control File, and datasets have been backed up and recorded there more than once, OLDBACKUP= specifies which version to restore. 0 restores the most recently dumped version, 1 the next most recent, etc., up to a maximum of 127. If ADATE= is also specified, OLDBACKUP= selects from multiple backups of the dataset on that date only (0 selects the last one dumped on that date, etc.).</p> <p>Default is 0.</p>
<b>PRESTAGE</b>	<p>Specifies that ABR is only to restore the data sets specified if they do not currently exist on the first target output disk ABR selects (<a href="#">See Sections 51.06 and 51.25</a>).</p>
<b>VOL=</b>	<p>Specifies the disk volume serial number from which the data set name was backed up. This operand is used to further select a data set on the Control File if the data set name was backed up multiple times.</p>

**51.27 USING A PERMANENT CONTROL FILE**

This section describes and includes examples for using Application Backup with a permanent Control File, one of the two major options (see the next section for the other).

There will be at least one unique permanent Control File for each application which uses Application Backup. This Control File will accumulate entries which record all of the Application Backups which have been done for that application.

Naturally you do not want to accumulate these backup records indefinitely, so a periodic FDRARCH maintenance job must be run against each of these Control Files in order to purge obsolete entries.

A report can be run against the Control File, using FDRABRP or FDREPORT (both documented in [Section 53](#)) or the SRS ISPF Dialog ([Section 56](#)) to show all the backups which exist for the application, the dates they were taken, and the tapes they are dumped to.

The high-level index of the Control File will also be used as the high-level index of all backup files on tape created by Application Backup, making it easier to identify the owner of the backup tapes and easier to define tape management rules for those tapes.

If you are restoring the datasets at your home site, you can simply reference the Control File, and Application Restore will restore the latest copy of every dataset recorded in it.

If you are restoring at a disaster site, you must first restore the latest copy of the Control File. You have two options for doing this:

- \* You can back up and restore the Control File independently of the Application Backup process. One way to do this is to back up the Control Files for all applications using the ABR backup subsystem, with full-volume and incremental backups. This means that the Control Files must be on volumes that are backed up by ABR backups, and which are recovered using ABR recovery ([See Section 52.08](#)) before doing any Application Restore.
- \* Unless you specify ARCBACKUP=NO during the Application Backup, ABR will automatically back up the Control File used as the last file on the backup tapes, and will catalog that backup file (the backup file can be a GDG to make it easier to recover it from various levels). You can restore the Control File from that backup, and then use it to restore the application datasets.

**To successfully restore at a disaster site, you must first restore all system catalogs that are involved, including the catalogs for the application datasets, and the catalogs in which the Application Backups themselves are cataloged (based on the names of the Control File and the ARCB1DSN/ARCB2DSN operands).**

In all the sample JCL shown, you may need to modify dataset names, unit names, and other parameters to meet local requirements.

CONTINUED . . .



## 51.27 CONTINUED . . .

**INITIALIZING  
THE CONTROL  
FILE**

To use a permanent Control File, you must initialize it with the FDRARCH utility. The following jobstream must be executed ONCE for each Control File.

The USERINDEX=YES option instructs ABR to name the backup files on tape using the high-level index of the Control File (if omitted, "FDRABR" or whatever general ABR index your installation has designated will be used). The rest of the name of the Control File is your choice.

If you intend to use the automatic backup of the Control File at the end of each Application Backup, and you do not specify the file names for that backup with the ARCB1DSN= and ARCB2DSN= operands, the Control File name must have an index level of ".ARCHIVE" somewhere in the name. The NODSNCK operand shown below prevents FDRARCH from insisting on an index level of ".ARCHIVE".

The value for RECS= will depend on the number of datasets that will ever be recorded in the Control File, considering the number of datasets in the application and the number of backups you intend to keep. However, the Control File can contain several hundred datasets per track (292 on a 3380, 348 on a 3390) (4 records are required for each VSAM cluster) so the space required is small. Any excess tracks beyond those required to hold the indicated number of datasets is released.

```
//FORMAT      EXEC   PGM=FDRARCH
//SYSPRI NT    DD     SYSOUT=*
//ARCHI VE     DD     DSN=PAYROLL. APPL. BACKUP, UNI T=SYSDA,
//              SPACE=(TRK, ( 10, 5), RLSE), DI SP=(, CATLG)
//SYSI N       DD     *
                FORMAT NODSNCK, RECS=1000, USERI NDEX=YES
/*
```

**APPLICATION  
BACKUP WITH  
ARCBACKUP**

This is an example of an Application Backup jobstream which includes a backup of the permanent Control File as the last file on the backup tape. ARCBACKUP=DSF is the default with TYPE=APPL and does not need to be specified.

Since both TAPE1 and TAPE11 are present, 2 copies of the backup are created, so that one can be sent offsite. The names of the backup tape files created will start with the high-level index of the Control file, but the rest of the name is controlled by ABR, as shown in [Section 52.05](#). These files will not be cataloged. They will be retained for 14 days.

The ARCB1DSN= and ARCB2DSN= operands are included to specify the name of the tape file which will contain the Control File backup; they are GDGs so that multiple copies of the backup can be tracked. The GDG bases must be created in the proper system catalog beforehand, specifying the number of generations to be kept. These files will be cataloged.

All cataloged datasets matching the SELECTs will be backed up.

```
//BACKUP      EXEC   PGM=FDRABR, REGI ON=2M
//SYSPRI NT    DD     SYSOUT=*
//SYSPRI N1    DD     SYSOUT=*
//SYSUDUMP     DD     SYSOUT=*
//ARCHI VE     DD     DSN=PAYROLL. APPL. BACKUP, DI SP=SHR
//TAPE1        DD     DSN=PAYBKUP. APPL1, UNI T=3490, DI SP=(, KEEP),
//              VOL=(, , , 255)
//TAPE11       DD     DSN=PAYBKUP. APPL1, UNI T=3490, DI SP=(, KEEP),
//              VOL=(, , , 255)
//SYSI N       DD     *
                DUMP      TYPE=APPL, ARCB1DSN=PAYROLL. APPL1. BACKUP1(+1),
                        ARCB2DSN=PAYROLL. APPL1. BACKUP2(+1), RETPD=14
                SELECT    CATDSN=PAYROLL. **
                SELECT    CATDSN=HOURLY. PAY*. **
/*
```

CONTINUED . . .

## 51.27 CONTINUED . . .

**APPLICATION  
BACKUP  
WITHOUT  
ARCBACKUP**

This is an example of an Application Backup jobstream that does not backup the permanent Control File. If the Control File will be required at a disaster site, it must be recovered by another means.

Only TAPE1 is present, so only one copy of the backup is created. The names of the backup tape files created will start with the high-level index of the Control file, but the rest of the name is controlled by ABR, as shown in [Section 52.05](#). These files will be cataloged. They will be retained for 30 days.

All cataloged datasets matching the SELECT will be backed up. Because of CATLIMITGDG=1, for any GDGs that match the SELECT, only the current (0) generation will be selected; the operand will not affect non-GDGs, they will all be backed up.

```
//BACKUP          EXEC      PGM=FDRABR, REGI ON=2M
//SYSPRI NT       DD        SYSOUT=*
//SYSPRI N1       DD        SYSOUT=*
//SYSUDUMP        DD        SYSOUT=*
//ARCHI VE        DD        DSN=PAYROLL. APPL. BACKUP, DI SP=SHR
//TAPE1           DD        DSN=PAYBKUP. APPL1, UNI T=3490, DI SP=(, KEEP) ,
//                VOL=(, , 255) , LABEL=RETPD=30
//SYSI N          DD        *
                DUMP        TYPE=APPL, ARCBACKUP=NO, ARCCAT=ALL
                SELECT      CATDSN=HOURLY. PAY*. **, CATLI MI TGDG=1
/*
```

**RESTORING  
THE CONTROL  
FILE**

If you are restoring the application files at your home site, or at a disaster site where you have recovered the Control File by another means such as full-volume recovery, you will not need to separately restore the Control File.

But at a disaster site, if you have backed up the Control File on the end of the backup tapes as shown in the first example in this section, you will need to restore it before you can restore the application datasets. This assumes that you have already restored the catalogs into which the backup of the Control File was cataloged. (If not, it is possible to restore the Control File by specifying DSN= the fully qualified name, and VOL=SER= and UNIT= and LABEL=, if that information is available at the recovery site.) The TAPE1 DD requests the latest generation of the COPY 2 backup of the Control File; in other words, it will restore the last backup that was recorded in the catalog before that catalog was backed up.

Since the Control File is backed up in DSF format, FDRDSF is used to restore it. This example will restore it to its original volume, and allocate it there if necessary. Since the Control File is the only dataset in this backup, SELECT ALLDSN will restore it. If the original volume is not available, you may need to specify the NVOL= operand to specify a new target volume.

```
//RETCF          EXEC      PGM=FDRDSF, REGI ON=2M
//SYSPRI NT       DD        SYSOUT=*
//SYSUDUMP        DD        SYSOUT=*
//TAPE1           DD        DSN=PAYROLL. APPL1. BACKUP2(0) , DI SP=OLD
//SYSI N          DD        *
                RESTORE     TYPE=DSF, RECAT
                SELECT      ALLDSN
/*
```

CONTINUED . . .

## 51.27 CONTINUED . . .

**RESTORING  
THE  
APPLICATION  
DATASETS**

This is the jobstep necessary to restore all of the application datasets. It can be used at your home site or with slight modifications at a disaster site.

It will restore the latest backup for every dataset recorded in the Control File. By default, it will attempt to restore every dataset to its original disk volume. If it cannot be allocated there, the ABR RESTORE ALLOCATION LIST, if enabled, can specify alternate volumes ([See Section 91.05](#)). The datasets do not need to be deleted or reallocated; ABR will simply restore over them if they exist.

If you need to restore other than the latest copy, you may need to add ADATE= or OLDBACKUP= operands to the SELECT. Also, if the application includes GDGs, you may need to add ADATE= the most recent date, to restore only as many generations as are supported to exist at one time. You can specify DSN= on one or more SELECTS if only certain datasets are required.

If you are restoring at a disaster site, you may need to add COPY=2 to the RESTORE or SELECT statement if Copy 2 is your offsite copy. However, your installation may modify the ABR Option Table to make Copy 2 the default for offsite restores.

```
//RESTAPPL      EXEC      PGM=FDRABR, REGI ON=2M
//SYSPRI NT      DD        SYSOUT=*
//SYSUDUMP       DD        SYSOUT=*
//ARCHI VE       DD        DSN=PAYROLL. APPL. BACKUP, DI SP=SHR
//SYSI N         DD        *
                RESTORE    TYPE=APPL, RECAT, VRECAT
                SELECT     ALLDSN
/*
```

**CONTROL FILE  
MAINTENANCE**

With permanent Control Files, a job must be run periodically against each Control File to reorganize it, primarily to eliminate expired entries. This job should usually be run once a week, but it may be run more or less frequently depending on how frequently the Application Backup is run and the number of datasets dumped.

This example will delete all expired entries, those past their expiration date. This assumes that a retention period (RETPD=) or expiration date (EXPDT=) was specified at backup time as shown in the earlier examples. It is possible to specify other criteria for deletion such as MAXOCCURRENCES=nn to retain “nn” copies of each dataset; see [Sections 55.14](#) and [55.15](#) for more information. In particular, if the application includes GDGs, you may want to specify MAXGENERATIONS=nn, so that only the appropriate number of generations will be retained (as an alternative to specifying ADATE= at restore time).

TAPE1 specifies a dataset used to take a temporary backup of the Control File during the reorganization. If ARCBACKUP=NO is used, then TAPE1 during reorganization should be a non-temporary data set kept until the successful completion of reorganization.

```
//REORG          EXEC      PGM=FDRARCH, REGI ON=1M
//SYSPRI NT      DD        SYSOUT=*
//SYSUDUMP       DD        SYSOUT=*
//ARCHI VE       DD        DSN=PAYROLL. APPL. BACKUP, DI SP=SHR
//TAPE1          DD        UNI T=SYSDA, SPACE=(TRK, ( 10, 5) )
//SYSI N         DD        *
                REORGDUMP  DEVI CE=DI SK, SORT=YES, SORTALLOC=YES
/*
```

**51.28 USING A GDG CONTROL FILE**

This section describes and includes examples for using Application Backup with a GDG Control File, one of the two major options (see the previous section for the other).

In this technique, a new Control File, defined as a GDG so that multiple versions of it can be kept, is created every time the Application Backup jobstream is run. A unique GDG must be created for every Application Backup; the name of the GDG can be any that meets your needs.

You must define the GDG base with a LIMIT that reflects the number of versions of the backups you desire for this application; different applications can have different LIMITs (up to 255). The GDG base should have the SCRATCH attribute so that old versions are scratched from disk automatically.

If you use the default of ARCBACKUP=DSF to make a copy of the Control File on tape, you can alternately define the Control File GDG with LIMIT(1) so that only the latest version is kept on disk. The backups on tape (which themselves can be a GDG) can be used to restore older versions of the Control File if required.

These GDG Control Files do not require any maintenance, since each contains only the records from one execution of Application Backup, and since they are automatically deleted when obsolete.

If your Control File GDG has a LIMIT greater than 1, FDREPORT can be used to document all the backups recorded in all the Control File generations, producing a consolidated report, as shown in an example in this section.

The high-level index of the Control File GDG will also be used as the high-level index of all backup files on tape created by Application Backup, making it easier to identify the owner of the backup tapes and easier to define tape management rules for those tapes.

If you are restoring the datasets at your home site, you can simply reference the proper generation of Control File (usually (0) to restore the latest) and Application Restore will restore every dataset recorded in it.

If you are restoring at a disaster site, you must first restore the latest copy of the Control File. You have two options for doing this:

- \* You can back up and restore the Control File independently of the Application Backup process. One way to do this is to back up the Control Files for all applications using the ABR backup subsystem, with full-volume and incremental backups. This means that the Control Files must be on volumes that are backed up by ABR backups, and which are recovered using ABR recovery ([See Section 52.08](#)) before doing any Application Restore.
- \* Unless you specify ARCBACKUP=NO during the Application Backup, ABR will automatically back up the Control File used as the last file on the backup tapes, and will catalog that backup file (the backup file can be a GDG to make it easier to recover it from various levels). You can restore the Control File from that backup, and then use it to restore the application datasets.

**To successfully restore at a disaster site, you must first restore all system catalogs that are involved, including the catalogs for the application datasets, and the catalogs in which the Application Backups themselves are cataloged (based on the names of the Control File and the ARCB1DSN/ARCB2DSN operands).**

In all the sample JCL shown, you may need to modify dataset names, unit names, and other JCL to meet local requirements.

CONTINUED . . .

51.28 CONTINUED . . .

**APPLICATION  
BACKUP WITH  
ARCBACKUP**

This is an example of an Application Backup jobstream which includes a backup of the Control File GDG as the last file on the backup tape. ARCBACKUP=DSF is the default with TYPE=APPL and does not need to be specified.

Since both TAPE1 and TAPE11 are present, 2 copies of the backup are created, so that one can be sent offsite. The names of the backup tape files created will start with the high-level index of the Control file, but the rest of the name is controlled by ABR, as shown in [Section 52.05](#). These files will not be cataloged. They will be retained for 14 days.

The ARCB1DSN= and ARCB2DSN= operands are included to specify the name of the tape file which will contain the Control File backup; they are GDGs so that multiple copies of the backup can be tracked. The GDG bases must be created in the proper system catalog beforehand, specifying the number of generations to be kept. These files will be cataloged.

All cataloged datasets matching the SELECTs will be backed up.

```
//BACKUP          EXEC      PGM=FDRABR, REGI ON=2M
//SYSPRI NT       DD        SYSOUT=*
//SYSPRI N1       DD        SYSOUT=*
//SYSUDUMP        DD        SYSOUT=*
//ARCHI VE       DD        DSN=PAYROLL. APPL. BACKUP(+1), DI SP=(, CATLG),
//                UNI T=SYSDA, SPACE=(TRK, (10, 5), RLSE) (see note)
//TAPE1           DD        DSN=PAYBKUP. APPL1, UNI T=3490, DI SP=(, KEEP),
//                VOL=(, , 255)
//TAPE11          DD        DSN=PAYBKUP. APPL1, UNI T=3490, DI SP=(, KEEP),
//                VOL=(, , 255)
//SYSI N          DD        *
  DUMP            TYPE=APPL, ARCB1DSN=PAYROLL. APPL1. BACKUP1(+1),
                  ARCB2DSN=PAYROLL. APPL1. BACKUP2(+1), RETPD=14
  SELECT          CATDSN=PAYROLL. **
  SELECT          CATDSN=HOURLY. PAY*. **
/*
```

Note: Depending on your system and local requirements, you may need to add a DCB= keyword or define a MODEL DSCB to create a GDG generation.

**APPLICATION  
BACKUP  
WITHOUT  
ARCBACKUP**

This is an example of an Application Backup jobstream that does not backup the GDG Control File. If the Control File will be required at a disaster site, it must be recovered by another means.

Only TAPE1 is present, so only one copy of the backup is created. The names of the backup tape files created will start with the high-level index of the Control file, but the rest of the name is controlled by ABR, as shown in [Section 52.05](#). These files will be cataloged. They will be retained for 30 days.

All cataloged datasets matching the SELECT will be backed up. Because of CATLIMITGDG=1, for any GDGs that match the SELECT, only the current (0) generation will be selected; the operand will not affect non-GDGs, they will all be backed up.

```
//BACKUP          EXEC      PGM=FDRABR, REGI ON=2M
//SYSPRI NT       DD        SYSOUT=*
//SYSPRI N1       DD        SYSOUT=*
//SYSUDUMP        DD        SYSOUT=*
//ARCHI VE       DD        DSN=PAYROLL. APPL. BACKUP(+1), DI SP=(, CATLG),
//                UNI T=SYSDA, SPACE=(TRK, (10, 5), RLSE) (see note)
//TAPE1           DD        DSN=PAYBKUP. APPL1, UNI T=3490, DI SP=(, KEEP),
//                VOL=(, , 255), LABEL=RETPD=30
//SYSI N          DD        *
  DUMP            TYPE=APPL, ARCBACKUP=NO, ARCCAT=ALL
  SELECT          CATDSN=HOURLY. PAY*. **, CATLI MI TGDG=1
/*
```

Note: Depending on your system and local requirements, you may need to add a DCB= keyword or define a MODEL DSCB to create a GDG generation.

CONTINUED . . .

51.28 CONTINUED . . .

**BACKUP ONLY  
ALLOCATION**

Sometimes you need to allocate certain application datasets at a disaster site, but plan to restore their contents by another means. For example, you might plan to recover some data bases with a data base recovery utility, but that utility needs to have the data bases pre-allocated. Application Backup can do this with the DATA=NONE operand.

When DATA=NONE is specified on a SELECT statement, Application Backup will back up only the description of the dataset, sufficient to allocate it, but will not back up any data tracks. When restoring the datasets, DATA=NONE must also be specified on the SELECT statement so that ABR will not attempt to restore the missing data tracks. For this reason, it is easiest to dump the DATA=NONE datasets into a separate Control File, as shown here.

It is possible to include DATA=NONE allocation-only backups in the same backup as regular Application Backups. In this case be sure to put the SELECTs with DATA=NONE before other SELECTs, if they are a subset, and be sure to include similar SELECTs in the restore jobs.

The Application Restore jobstream shown in this section is used to restore these allocations, except that DATA=NONE must be added to the SELECT.

```
//BACALLOC      EXEC      PGM=FDRABR, REGI ON=2M
//SYSPRI NT      DD        SYSOUT=*
//SYSPRI N1      DD        SYSOUT=*
//SYSUDUMP       DD        SYSOUT=*
//ARCHI VE      DD        DSN=PAYROLL. ALLOC. BACKUP(+1), DI SP=(, CATLG),
//              UNI T=SYSDA, SPACE=(TRK,(10,5), RLSE) (see note)
//TAPE1          DD        DSN=PAYBKUP. ALLOC1, UNI T=3490, DI SP=(, KEEP),
//              VOL=(, , 255)
//TAPE11         DD        DSN=PAYBKUP. ALLOC1, UNI T=3490, DI SP=(, KEEP),
//              VOL=(, , 255)
//SYSI N        DD        *
DUMP            TYPE=APPL, ARCB1DSN=PAYROLL. ALLOC1. BACKUP1(+1),
                ARCB2DSN=PAYROLL. ALLOC1. BACKUP2(+1), RETPD=14
SELECT          CATDSN=PAYROLL. DB. **, DATA=NONE
/*
```

Note: Depending on your system and local requirements, you may need to add a DCB= keyword or define a MODEL DSCB to create a GDG generation.

**RESTORING  
THE CONTROL  
FILE**

If you are restoring the application files at your home site, or at a disaster site where you have recovered the Control File by another means such as full-volume recovery, you will not need to separately restore the Control File.

But at a disaster site, if you have backed up the Control File on the end of the backup tapes as shown in the example in this section, you will need to restore it before you can restore the application datasets. The jobstream in [Section 51.27](#) can be used to do this.

CONTINUED . . .

51.28 CONTINUED . . .

**RESTORING  
THE  
APPLICATION  
DATASETS**

This is the jopstep necessary to restore all of the application datasets. It can be used at your home site or with slight modifications at a disaster site.

It will restore all the datasets recorded in the Control File. This example calls for the current generation of the Control File; you can call for generation “—n” if an earlier version is required. You can specify DSN= on one or more SELECTS if only certain datasets are required.

By default, ABR will attempt to restore every dataset to its original disk volume. If it cannot be allocated there, the ABR RESTORE ALLOCATION LIST, if enabled, can specify alternate volumes ([See Section 91.05](#)). The datasets do not need to be deleted or reallocated; ABR will simply restore over them if they exist.

If you are restoring at a disaster site, you may need to add COPY=2 to the RESTORE or SELECT statement if Copy 2 is your offsite copy. However, your installation may modify the ABR Option Table to make Copy 2 the default for offsite restores.

```
//RESTAPPL      EXEC      PGM=FDRABR, REGI ON=2M
//SYSPRI NT      DD        SYSOUT=*
//SYSUDUMP       DD        SYSOUT=*
//ARCHI VE       DD        DSN=PAYROLL. APPL. BACKUP( 0) , DI SP=SHR
//SYSI N         DD        *
      RESTORE      TYPE=APPL, RECAT, VRECAT
      SELECT      ALLDSN
/*
```

**REPORTING  
ON  
APPLICATION  
BACKUPS**

It is possible to produce a report on the contents of a single generation of the Control File with program FDRABRP or FDREPORT (both described in [Section 53](#)) or the SRS ISPF Dialog ([Section 56](#)), but it is more likely that you would like to see a combined report on all the generations of the Control File, showing all the Application Backups that exist for a given Application. This can be done with a special execution of FDREPORT.

This jobstream identifies all the generations that exist for a specified Control File name, extracts the data from each into a combined reporting file, then reports on that combined data. It sorts on dataset name and disk volser and reports in a standard ARCHIVE report format, but other options are possible as described in [Section 53.20](#).

```
//REPTAPPL      EXEC      PGM=FDREPORT, REGI ON=2M
//SYSPRI NT      DD        SYSOUT=*
//ABRMAP         DD        SYSOUT=*
//SYSUDUMP       DD        SYSOUT=*
//SYSUT2         DD        UNI T=SYSDA, SPACE=(CYL, ( 10, 5) ) , DI SP=(MOD, DELETE)
//SYSPUNCH       DD        UNI T=SYSDA, SPACE=(TRK, ( 2, 1) )
//SYSI N         DD        *
      DEFAULT      SORTALLOCATE=YES
*   FIND ALL      GENERATI ONS OF THE SPECI FIED ARCHI VE CONTROL FI LE
*   GENERATE      FDREPORT STATEMENTS TO PROCESS THEM.
      XSELECT      XDSN=PAYROLL. APPL1. BACKUP. G*, DSORG=DA
      PUNCH        FDRLI B=MASK
      REPORT       RPTYPE=SELPCH, DATATYPE=CATVTOC
      CANCEL
*   EXECUTE THE GENERATED FDREPORT STATEMENTS TO CREATE A COMBI NED
*   EXTRACT FI LE
      EXECUTE      FDRLI B=SYSPUNCH
      CANCEL
*   GENERATE THE COMBI NED REPORT FROM THE EXTRACT FI LE
      SORT FI ELD=(DSN, VOL)
      PRI NT       DATATYPE=EXTRACT, RPTYPE=ARCHI VE
/*
//MASK          DD        *
      DEFAULT      ARCD SN=; WLDSN; WR, COPY=BOTH
      PRI NT       DATATYPE=ARCHI VE, RPTYPE=DATA
/*
```

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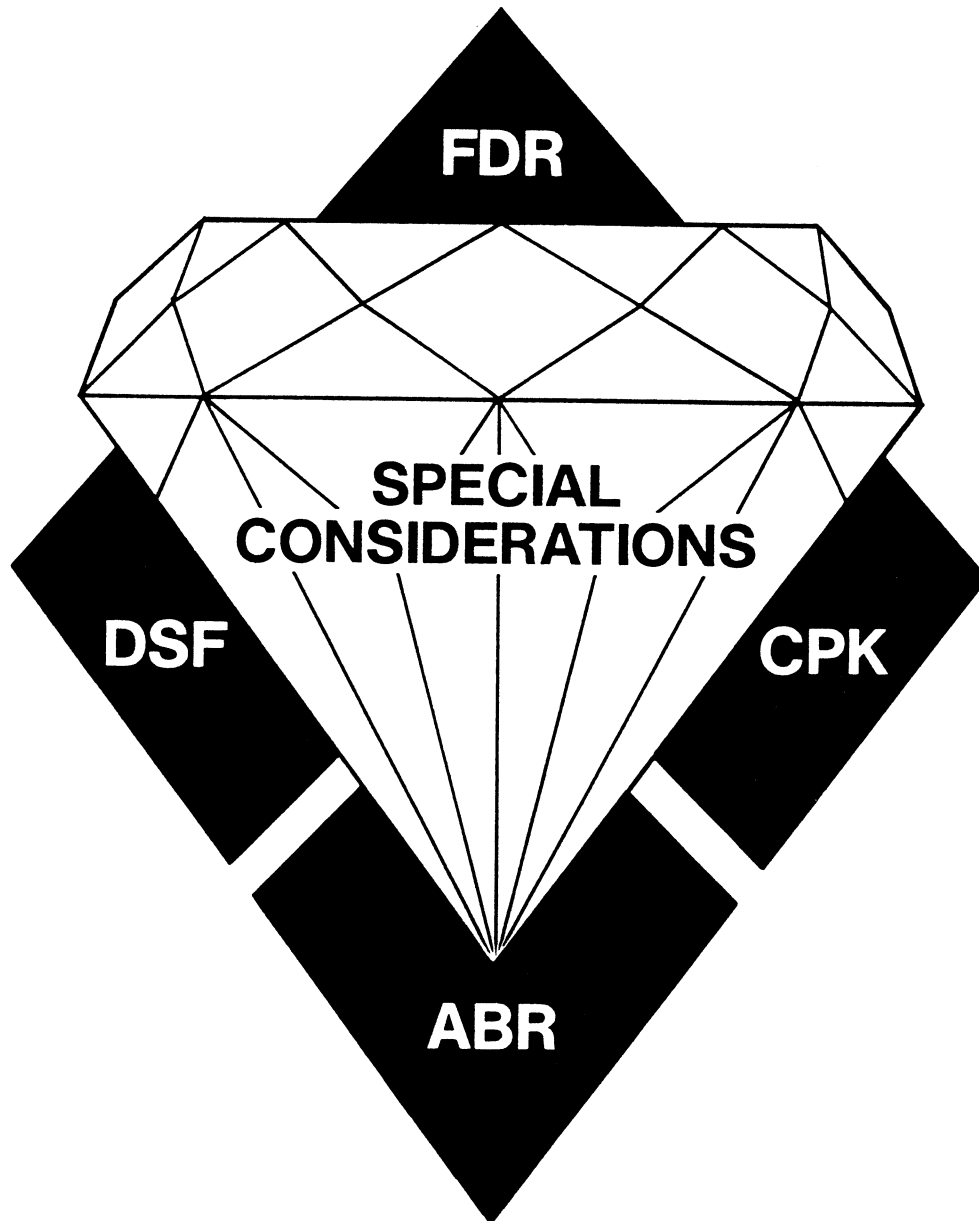
# FDR/COMPAKTOR/ABR

## SPECIAL CONSIDERATIONS

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**52.01 SPECIAL CONSIDERATION OVERVIEW**

This section details special considerations, terminology, and rules for FDR, CPK, and ABR processing. It's purpose is to centralize the documentation of the rules and terminology used by the programs within the FDR/CPK/ABR system, and to document considerations for special environments or processing which apply to more than one component of the system.



**52.02 SELECTION RULES FOR INCREMENTAL BACKUPS**

Data set selection during an incremental backup (Program FDRABR with DUMP TYPE=ABR or TYPE=AUTO) is controlled by the various criteria detailed below:

- VTOC** ABR will always backup the VTOC on incremental backups. The VTOC index will also be dumped, if found on the volume. Since the VTOC is dumped, ABR has the ability to recreate the entire disk volume, if necessary, starting from this backup, reading any prior tapes from the current generation until restoration is completed.
- PROTECT LIST** ABR will not dump data sets specified by the ABR protect list. This list is defined and enabled by program FDRZAPOP ([Section 91](#)) or by the FDR/ABR ISPF support ([See Section 92](#)).
- SELECT/  
EXCLUDE  
COMMANDS** ABR will backup or exclude any data set selected by the user. SELECT and EXCLUDE control statements will override all backup selection rules except for the backup of the VTOC and the PROTECT list.
- If UPDATE is specified on a SELECT command the data set will only be dumped if the update indicator is set in the DSCB.
- SPECIAL  
PROCESSING  
OPTIONS** If the data set has been set to 'never backup' by program FDRABRM (OPTIONS=EX), the data set will not be dumped on an incremental backup; only the full volume dump will backup this data set. The data set will always be backed up if the data set has been set to 'always backup' by FDRABRM (OPTIONS=AD). [See Section 55](#) for details. A SELECT or EXCLUDE command will override these special processing options.
- WARNING: Data sets excluded from incremental backup by the protect list, by EXCLUDE, or by the 'never backup' (OPTION=EX) option may not be properly restored by an ABR full volume restore from the incremental backups if they were updated since the full volume dump.**
- TEMPORARY  
DATA SETS** ABR will not dump temporary data sets. A temporary data set is defined as a data set whose name starts with the characters 'SYS', and contains a '.' in position 9 and 10, and a period in position 17.
- UPDATE  
INDICATOR** ABR will backup all data sets on a disk volume which have been updated since the last backup. ABR examines the update bit in the DS1DSIND field of the DSCB. If the data set has been updated, it will be dumped. ABR will also backup a data set if it does not have a current ABR backup.
- CATALOG** ABR will always dump an OS CVOL catalog and any ICF VSAM catalogs if present on the disk volume.
- REMOTE  
QUEUE** ABR will backup any data sets requested via the FDRABRUT program or the TSO/ISPF Panels. The remote queue program either sets the update indicator in the DSCB or adds a control statement entry to a remote queue data set. If the ABRBKDQ DD statement is present, ABR will dump any data sets currently in the queue.
- VVDS** ABR will always backup the SYS1.VVDS data set if it is present on the volume.

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## 52.02 CONTINUED . . .

**ICF VSAM** The keyword ICFSU60 or the option ICFSU60 in the FDR Global Option table ([See Sections 91 or 92](#)) informs ABR that ICF VSAM clusters have an accurate update indicator in the DSCB of the base data component. This option should be set if the Innovation modification to IBM exit IDATMSTP (or its equivalent, for example, the DFHSM IDATMSTP) is installed. ABR will select all components of a cluster (including keyranges and alternate indexes) when that update flag is on.

If ICFSU60 is not specified, ABR will always treat all ICF VSAM as having been updated, and will always back it up unless EXCLUDEd or protected or the “NOVSAM” operand is specified on the DUMP statement. “NOVSAM” will not prevent ABR from backing up ICF VSAM clusters which have the update flag on, or which have no current ABR backup.

If ABR is executing on a system with DFP/MVS 3.1 or above installed, ICFSU60 will be assumed since that level of DFP always maintains the update indicator on all data sets.

**MULTI-VOLUME ICF VSAM** IBM’s exit for update support for ICF VSAM files will only set the update indicator and last reference date on the base cluster data component (first volume only). Multi-volume data components, index components on a volume without the data component and key ranges (all volumes) will not have the update indicator set. ABR will always dump these components if found on the volume, except for an alternate index residing on a volume by itself.

**NON-ICF VSAM** ABR, by default, will backup non-ICF VSAM data spaces on incremental backups. This is done since MVS does not support the setting of the update flag for non-ICF VSAM data spaces. If the user specifies the operand “NOVSAM”, ABR will backup VSAM files only when specified by SELECT control statements. VSAM data spaces are always dumped when doing a full volume dump.

**CPK** If a COMPAKTion is done, COMPAKTOR sets the update indicator for all the data sets which it moved. ABR will backup all of those data sets on the volume on the next backup cycle after COMPAKTion. [See Section 40](#) for more information.

**SYSTEM MANAGED STORAGE** If SMSMANAGE=YES is specified on the DUMP statement, SMS-managed data sets may be excluded from incremental backup based on their SMS management class attributes. [See Section 52.50](#) for details.

**52.03 SELECTION RULES FOR ARCHIVE OR SUPERSCRATCH**

For an ARCHIVE Dump (DUMP TYPE=ARC) or SUPERSCRATCH (DUMP TYPE=SCR) operation, ABR uses the following rules for data set selection.

If SMSMANAGE=YES is specified on the DUMP statement, SMS-managed data sets will be selected for ARCHIVE or SUPERSCRATCH based on the attributes of their associated SMS management class instead of or in addition to the following rules. [See Section 52.50](#) for details.

Selection is based on the ARCHIVE SELECTION CRITERIA on the DUMP statement and/or SELECT statements, using the keywords ADAYS=, EXPIRED, IFNOTCAT, MAXGDG=, and NOPASS (plus, on the DUMP statement only, ADATE=, REMOTE and VALIDATE).

If a SELECT statement is found which selects a given data set (that is, all of the keywords such as DSN/DSG, CRDAYS, DSORG, GDG, SIZE, and VOL/VOLG match the data set), and any ARCHIVE SELECTION CRITERIA keywords were specified on that SELECT, the data set will be selected for archive if it matches ANY of those criteria. If no ARCHIVE SELECTION CRITERIA were specified on the SELECT statement, the data set will be unconditionally archived. Of course, a EXCLUDE or PROTECT statement preceding the SELECT statement will protect the data set from archiving.

If a given data set is not matched by any SELECT, EXCLUDE, or PROTECT statement, it may still be selected for archive if ARCHIVE SELECTION CRITERIA keywords were specified on the DUMP statement and the data set matches ANY of them. If no criteria keywords are on the DUMP statement, then ONLY data sets matching the SELECT criteria will be archived or scratched.

NOTE: If CRDAYS is specified on the DUMP control statement without any of the GENERAL ARCHIVE SELECTION CRITERIA keywords, ABR will not select any data sets encountered unless selected by a SELECT command. If the user wishes to select data sets based only on the age of the data set, specify CRDAYS on the SELECT command.

ABR will examine all the volumes pointed to by DISKxxxx DD statements. If ONLINE is specified, ABR will also examine all the disk volumes that are online to the system. The ONLVOL keyword and the MOUNT command are other ways to specify volumes to be examined. Every data set found in the VTOCs of the volumes processed will be passed through the filtering processing described above, to select the data sets to be archived or scratched.

If ADATE= or ADAYS= is specified, ABR will examine the last reference date in the Format 1 DSCB. If it is less than ADATE or today's date minus ADAYS, the data set will be ARCHIVED and/or scratched.

ABR will ARCHIVE data sets requested via the remote queue program FDRABRUT or the TSO/ISPF Panels. FDRABRUT either sets a special indicator in the DSCB or adds a control statement to the remote queue data set. If REMOTE or any other GENERAL ARCHIVE SELECTION CRITERIA is specified, ABR will select all data sets marked for ARCHIVE by the special indicator in the DSCB. If the ABRARDQ DD statement is present, ABR will ARCHIVE all data sets currently in the queue. If SUPERSCRATCH (TYPE=SCR) is specified, the remote queue is never referenced.

**ARCHIVE  
CONTROL FILE  
BACKUP**

ABR will normally backup the ARCHIVE control file at the end of an ARCHIVE operation. This file will be piggybacked to the last file on the last ARCHIVE dump tape. Two types of backup are available for the ARCHIVE control file. The default (ARCBACKUP=ABR) is that an ABR incremental backup of just this data set is done. This backup will increment the CYCLE for the volume the ARCHIVE file resides on and may force a full-volume backup, incrementing the GEN, so this option is not recommended. The second type of backup (ARCBACKUP=DSF) causes ABR to use DSF outside the ABR incremental system to backup this data set. ABR will create and catalog the backup file on tape with the same name as the ARCHIVE control file itself, except that the index level 'ARCHIVE' will be changed to 'ARCBKUP' for TAPE<sub>x</sub> and 'ARCBKU2' for TAPE<sub>xx</sub> (if duplicate backup). This cataloged name will only keep track of the most current backup.

If the ARCHIVE job uses DISK as the backup medium, ABR will default to not backing up the control file. This default should not be overridden.

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## 52.03 CONTINUED . . .

**ICF VSAM** ABR can only ARCHIVE or SUPERSCRATCH ICF VSAM files by cluster name. Individual components cannot be scratched. Active catalogs and multi-volume VSAM files cannot be scratched. Option ICFSU60 must be enabled in the FDR/ABR Global Option Table or specified on the DUMP command for ABR to use the last reference date. However, ICFSU60 will be assumed if you are running DFP V3 or above. ABR will only use the last reference date stored in the data component for the base cluster ([See Section 52.11](#)). If a VSAM cluster is selected automatically or by specific request, ABR will find and scratch all of the individual components (including alternate indexes) associated with the cluster.

**EXCEPTIONS  
TO  
AUTOMATIC  
ARCHIVING**

The following data sets will never be selected for ARCHIVE/SUPERSCRATCH:

- . . . Data sets in the ARCHIVE protect list, if the protect list is enabled (ARCPROT/PROTECT).  
On TYPE=SCR, data sets in the SCRATCH Protect List if enabled (SCRPROT/SCREXCL).
- . . . Data sets marked 'do not archive', i.e. data sets for which OPTIONS=AD or ND or EX have been set with program FDRABRM.
- . . . Data sets on volumes marked as 'disabled for archiving' for TYPE=ARC or 'disabled for superscratch' for TYPE=SCR by program FDRABRM or the ABR TSO/ISPF panels.
- . . . Data sets with the ABR prefix normally 'FDRABR', except that if SELECT ABRBKUP is specified then ABR will select ABR backup data sets which are expired.

*The following data sets will not be selected by General Archive Selection Criteria on the DUMP statement or by a SELECT ALLDSN statement, but can be selected by other SELECT statements:*

- . . . Data sets prefixed by 'SYS1'.
- . . . OS 'PASSWORD' data set.
- . . . 'SYSCTLG' data set (OS CVOL catalog)
- . . . Temporary data sets. If you want to select temporary data sets, specify SELECT TEMP ; however, this may allow temporary data sets to be SCRATCHed even if they are active, unless DSNENQ= is specified (in a multi-CPU environment, even DSNENQ= may not be sufficient, since even cross-CPU ENQ products may not broadcast the ENQ on temporary data sets so we recommend adding CRDAYS=1 or more to ensure that recently created temporaries are excluded). Be sure that the SELECT TEMP precedes any SELECT ALLDSN or any other SELECT that would select the same data sets.
- . . . Data sets with a last reference date of zero (0) if data set selected by ADAYS= or ADATE=.
- . . . Non-ICF VSAM files.
- . . . ICF VSAM will not be selected based on ADAYS= or ADATE= unless the ICFSU60 option is specified or enabled in the ABR option table.
- . . . ISAM files if 'NOISAM' is specified.
- . . . Model DSCBs (data sets with no extents).
- . . . Data sets found active when using the data set enqueue option (DSNENQ=), unless ENQERR=PROCESS is specified.

If a data set is selected by a SELECT command (and not excluded by a preceding EXCLUDE command), it will be ARCHIVED unless it falls into one of the first four categories in the above list. If a data set is selected by a SELECT ALLDSN command, it will be ARCHIVED unless it falls into any of the categories listed above.

If a data set is requested for ARCHIVEing by the ARCHIVE command of the remote queue utility FDRABRUT, then:

- If DISKUPDATE=YES is in effect, the DSCB for the data set will be marked with the ARCHIVE request unless the data set falls into one of the first four categories in the above list.
- If DISKUPDATE=NO is in effect, then the ARCHIVE request will always be written to the remote queue data set.

**52.04 DATA SET RESTORE RULES**

Data set selection and where a data set gets restored to by ABR are controlled by the operands of the SELECT Command. The rules vary by the type of restore.

**RESTORE  
FROM  
ARCHIVE**

For restore from the ARCHIVE subsystem (TYPE=ARC), ABR will search the ARCHIVE Control File for the data sets specified. If a data set selected for restore has been archived more than once, you can specify VOL= (original disk volume serial) and/or ADATE= (date of archive) and/or OLDBACKUP= (relative archived version) to tell ABR which version to restore, otherwise the most recently archived version will be restored. If VOL= is not specified, and a multi-volume VSAM or non-VSAM data set is selected, all pieces of that data set will be restored.

If NEWNAME/NEWGROUP/NEWINDEX is specified, the data set will be restored using the new name; otherwise it will be restored using its original name. If NVOL= is specified, the data set will be restored to that specified volume serial (or the first volser specified); otherwise the catalog will be searched for the output data set name (either the original name or the new name). If found, the data set will be restored to the volume serial specified in the catalog; if not found, the restore will be attempted to the volume serial from which the data set was archived.

In all cases, after ABR selects an output volume, ABR allocates space for the data set unless the data set already exists on that volume. If the allocation fails, for example because not enough space is available or the volume is not online, then ABR may attempt to allocate and restore the data set to other volumes:

- \* If the NVOL= operand specified more than one volume serial, all of those volumes may be tried.
- \* If the RESTORE ALLOCATION LIST is active ([See Section 91](#)), and it has an entry which matches the data set being restored, the output volumes specified there may be tried.
- \* If there is both an NVOL list on the SELECT and a matching RESTORE ALLOCATION LIST entry, the two lists will be merged in ascending device address (UCB address) order, except that the first volume on the NVOL list will be first.

More details on output volume selection are in [Section 51.06](#).

If ABR allocates a data set, ABR will catalog the data set unless the data set is presently cataloged to a different volume. If RECAT is specified, ABR will recatalog the data set to this volume; RECAT should normally be specified for ARCHIVE restores to turn off the RECALL indicators and in case ABR allocated the data set on a new volume. ICF VSAM files are always cataloged if allocated, and cannot be allocated if they are currently cataloged as being on this or another volume unless VRECAT is specified (However, VRECAT is not required if the ICF VSAM cluster was cataloged for RECALL).

ABR will default to selecting COPY1 for the restore unless COPY1 was not created or has expired. COPY2 will then be selected if it exists. If TAPE=EXP is coded on the RESTORE TYPE=ARC statement ABR will ignore the expiration date test.

**RESTORE  
FROM  
CURRENT  
BACKUP**

For the restore of the most recent backup of a data set from the backup subsystem (TYPE=ABR), ABR must find the Format 1 DSCB (VTOC entry) of that data set, since backup information is kept in the F1 DSCB. ABR must first determine the volume serial number from which the data set was dumped. If VOL= is not coded, ABR will search the catalog for the data set and get the volume serial from the catalog entry. ABR then reads the F1 DSCB of the data set from the VTOC of that volume to determine current backup information (generation and cycle of the latest backup).

If the data set was not found in the catalog or in the VTOC, or it has no current backup or the volume was offline, ABR will search the SCRATCH catalog (if enabled; see [Section 92.50](#)), which records backup information for data sets which have been scratched or renamed on disk. If VOL= was specified, the search will be successful only if it is recorded as being scratched or renamed on that volume serial.

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## 52.04 CONTINUED . . .

If NEWNAME/NEWGROUP/NEWINDEX is specified, the data set will be restored using the new name; otherwise it will be restored using its original name. If NVOL= is specified, the data set will be restored to that specified volume serial (or the first volser specified); otherwise the catalog will be searched for the output data set name (either the original name or the new name). If found, the data set will be restored to the volume serial specified in the catalog; if not found, the restore will be attempted to the volume serial from which the data set was dumped. In all cases, after ABR selects an output volume, ABR allocates space for the data set unless the data set already exists on that volume. If the allocation fails, for example because not enough space is available or the volume is not online, then ABR may attempt to allocate and restore the data set to other volumes:

- \* If the NVOL= operand specified more than one volume serial, all of those volumes may be tried.
- \* If the RESTORE ALLOCATION LIST is active ([See Section 91](#)), and it has an entry which matches the data set being restored, the output volumes specified there may be tried.
- \* If there is both an NVOL list on the SELECT and a matching RESTORE ALLOCATION LIST entry, the two lists will be merged in ascending device address (UCB address) order, except that the first volume on the NVOL list will be first.

More details on output volume selection are in [Section 50.08](#).

If ABR allocates a data set, ABR will catalog the data set unless the data set is presently cataloged to a different volume. If RECAT is specified, ABR will recatalog the data set to this volume; RECAT is recommended in case ABR allocated the data set on a new volume. ICF VSAM files are always cataloged if allocated, and cannot be allocated if they are currently cataloged as being on this or another volume unless VRECAT is specified.

#### RESTORE FROM OLDER BACKUP

For the restore of other than the most recent backup of a data set from the backup subsystem (TYPE=ABR), ABR must locate old backup information for this data set; retention of old backup data is enabled for each disk volume by options set in the ABR model on the volume; if old backup recording is not enabled on a given volume, then ABR can automatically restore only the most current backup. However, even in that case, older backups can be restored if the ABR generation and cycle of the backup is known (using the GEN= and CYCLE= parameters).

When an older backup is requested (via OLDBACKUP=nn), the process for locating the old backup information is essentially the same as described above for "Restore from Current Backup". Old backup information is stored either in the F1 DSCB (up to 13 backups, depending on installation options), or in the SCRATCH catalog (maximum of 4). Once the generation and cycle of the backup have been determined, the restore process proceeds normally.

Program FDRABRP with the command PRINT BACKUP,OLDBACKUP=ALL or PRINT SCRATCH,OLDBACKUP=ALL or the TSO/ISPF REPORT Panel can be used to display all of the backups of this data set which ABR is currently tracking. The entries are displayed in backup date sequence (most current first). The value displayed under BK NO or in the parentheses after BDATE is the relative backup number. Zero is the current entry, one the next oldest backup for this data set and so on. This is the value to be specified for the OLDBACKUP= Operand on the ABR Restore Control Statement or for BACKUP SOURCE on the TSO/ISPF RESTORE or REMOTE QUEUE Panel.

Example of an ABR Backup Report:

DATA SET NAME	BACKUP DATE	BK NO	TAPE DSN SUFFIX	TAP FIL	TAPE VOLUME(S)
XYZ.DATA	90.010	00	C1003600	002	000100
	90.009	01	C1003510	003	015621
	90.007	02	C1003508	001	195626

Example of a TSO Formatted Report:

DSN-XYZ.DATA		VOL-vvvvvv VSEQ-1	
LAST REF-90.010	DSORG-PS	ALLOC-30	FREE-15
***** BACKUP INFORMATION *****			
BDATE(00)-90.010	SFX-C1003600	FN-002	VOLS-000100
BDATE(01)-90.009	SFX-C1003510	FN-003	VOLS-015621
BDATE(02)-90.007	SPF-C1003508	FN-001	VOLS-195626

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## 52.04 CONTINUED . . .

**ABR MANUAL  
RESTORES**

ABR allows you to override the backup information obtained from the backup subsystem. Several keywords are supplied for this function. They are as follows:

**GEN=gggg** Overrides the generation number.

**CYCLE=cc** Overrides the cycle number.

**TAPEDD=x** Completely overrides all tape information.

These keywords are used if you wish to restore from a previous generation or cycle of the data set or if the backup information ABR retains for the data set does not exist. If you wish to restore data sets from a backup tape created by FDR or FDRDSF outside of ABR, the TAPEDD= option is used; the backup file information is supplied on the TAPEX DD statement.

The output volume for each data set restored with TAPEDD= or with GEN/CYCLE is selected by the normal ABR rules, documented in [Section 50.08](#). DISKxxxx DD statements will not be used for volume selection.

**WHAT DSF  
RESTORES IN  
THE DSCB**

DSF or ABR updates the DSCBs in the VTOC on a data set restore or FDRCOPY COPY/MOVE. The following fields in the DSCB are restored from the backup information or the input data set.

DS1VOLSQ	— Vol Sequence Number	DS1NOBDB	— Last Directory Block
RESERVED	— Location 61(X '3D')	DS1SYSCD	— System Code (note 2)
DS1RECFM	— Record Format	DS1DSORG	— Data Set Organization
DS1BLKL	— Block Length	DS1OPTCD	— Option Code
DS1KEYL	— Key Length	DS1LRECL	— Record Length
DS1LSTAR	— Last Used Track	DS1RKP	— Relative Key Position
		DS1TRBAL	— Track Balance

The following fields are retained as they were on the output disk before the RESTORE/COPY/MOVE:

DS1CREDIT	— Creation date (Note 3)	DS1NOEPV	— Number of extents
DS1EXT1/2/3	— Extent descriptors		
DS1PTRDS	— Pointer to F2 or F3 DSCB, if any		

The following fields are handled specially by DSF/ABR:

DS1DSSN	— Data Set Serial — If this field matches the volume serial from which the backup was taken, DSF will reset it to the new volume serial, if necessary. If this value does not match the volume serial it will be restored from the backup. (See Note 2.)
DS1EXPDT	— Expiration date — Restored from the backup, if zero on the disk. (See Note 1.)
DS1REFD	— Last Reference Date — is always set to today's date.
DS1SMSFG	— Location 78 (X '4E') — on an SMS-managed volume, this SMS flag byte is never restored. On a non-SMS volume the byte is a reserved byte and is restored (unless the data set being restored was SMS-managed). (See Note 2).
DS1SCEXT	— Location 79-81 (X '4F'-X '51') — extended secondary allocation fields, valid only if a flag is set in the DS1SCALO field. Will be restored if the extended secondary allocation flag is not set on the output DSCB. Prior to DFP/MVS V3, these were reserved bytes. (See Note 2).
DS1DSIND	— Data Set Indicators — restored from the backup except that the update indicator X '02' is always turned on.
DS1SCALO	— Secondary allocation — Restored from the backup, if zero on the disk. (See Note 1).
ABR RESERVED	— Locations 103 and 104 — these fields are used by ABR and are set to reflect the current and OLDBACKUP status. The ABR indicators AD, ND, or EX are restored from the backup.

NOTE 1: If DSF/ABR allocates the data set, the expiration date and secondary allocation are always restored from the backup.

NOTE 2: If this field is being used to record OLDBACKUP information under ABR, then DSF does special OLDBACKUP processing.

NOTE 3: A FDRCOPY MOVE will copy the creation date from the input data set.

Custom ZAP's are available to change some of the above rules concerning which fields do or do not get restored from the backup file.

**52.05 GENERATION AND CYCLE/BACKUP DATA SET NAMES**

The terminology of Generation and Cycle is used throughout the ABR incremental backup subsystem.

**GENERATION** A Generation is defined as all the backup files created, starting with a full volume backup, up to but not including the next full volume backup. Each time a TYPE=FDR backup is executed or forced, a new generation of backups is started.

**CYCLE** A Cycle is defined as each individual backup within a generation. The full volume backup is always cycle zero. Each incremental (TYPE=ABR) or manual (TYPE=DSF) backup is an additional cycle within the generation. A maximum of 63 cycles can be created within a generation.

**BACKUP DATA SET NAMING CONVENTIONS** The backup data sets created by the ABR backup subsystem (DUMP TYPE=FDR, ABR, DSF and AUTO) include the generation and cycle number in their names.

The format is: **abrindex.Vvvvvvv.Cngggg**

where:

**abrindex** – is the ABR hi-level index from the ABR Global Option Table. It is usually “FDRABR”. It can be changed when ABR is installed but must NOT be changed once you start using ABR.

**vvvvvv** – is the volume serial of the disk volume from which the data sets were dumped. ABR creates one backup file for each disk volume processed in a given ABR run.

**n** – is the copy number. ABR creates copy 1 and optionally copy 2. Copies up to 9 can be created by FDRTCOPY (See Section 10.10).

**gggg** – is the generation number (4 digits)

**cc** – is the cycle number (2 digits)

Example: FDRABR.VPROD01.C1023703

**ARCHIVE BACKUP DATA SET NAMING CONVENTIONS** The backup data set names created by the ABR ARCHIVE subsystem (DUMP TYPE=ARC) have the format: **abrindex.Vvvvvvv.bnyydddx**

where:

**abrindex** – is the ABR hi-level index as described above (normally “FDRABR”). However, application backup (DUMP TYPE=APPL) may use a user-defined index so that these backups can be more easily related to their owners; for details see Sections 51.20.

**vvvvvv** – is the volser of the disk volume from which the data sets were ARCHIVED. ABR creates one or more backup files for each disk volume processed in a given ABR run.

**n** – is the copy number. ABR creates copy 1 and optionally copy 2.

**yyddd** – the julian date of the ARCHIVE run.

**b and x** – are qualifiers added to make the name unique if multiple ARCHIVE backups are created for the same disk volume on the same julian date. “b” will initially be set to “B” while “x” will cycle from A to Z and 0 to 9. When “x” has reached its maximum value (9), then “b” will reset to “D” through “J” while “x” cycles again. This allows for a maximum of 255 ARCHIVES per disk per day. However, this name change occurs only if the name ABR is trying to create is already in the ABR or user catalog (see below).

Examples: FDRABR.VTSO002.B193147A  
FDRABR.VTSO002.E193147Q

**ABR CATALOG ENTRIES** If the ABR catalog is an ICF VSAM catalog, ABR no longer stores the backup date in the device type field since there is a separate field for creation date. The device type in the catalog entries for ABR backups will be valid, and the catalog can be used, if necessary, to refer to a specific ABR backup in JCL.

ABR full volume and incremental backups are always cataloged in the ABR catalog. ABR requires the catalog entry to locate the backup.

ABR ARCHIVES are cataloged in the ABR catalog if any of the following conditions exist:

- 1) The backup is on disk.
- 2) It is the first backup file created in the ABR step.
- 3) The backup volser list changes from the previous backup, as when a new tape is required.
- 4) The backup from one disk volume exceeds 5 volumes.
- 5) EXPDT=99000 is specified for a tape backup file.

Application backups will not be cataloged at all (except for the backup of the ARCHIVE Control File as described in Section 51.20). However, if the application backup file exceeds 5 volumes, it will be cataloged in the ABR or user catalog (depending on the value of “abrindex”). When the backup exceeds 5 volumes, ABR does require that catalog entry to restore from that backup.

**MOVING ABR CATALOG** If the ABR catalog is to be moved to a like device, a DSF backup and restore can be used. IDCAMS EXPORT/IMPORT or REPRO can also be used to move the ABR catalog. The member MOVECAT in the Installation Control Library (ICL) presents recommendations and considerations for moving the ABR catalog.

**52.06 RETENTION/EXPIRATION**

The Expiration Date (EXPDT) is the julian date (yyddd) on which an ABR tape will expire, in other words, the date on which it can be overwritten. It can be explicitly specified, or can be calculated from a Retention Period (RETPD) as the current date plus the RETPD. This date is stored in the label of the backup tape, and may also be recorded by a tape management system. For ABR backups on disk, the expiration will be recorded in the F1 DSCB of the backup data set. Although the operating system will not allow a data set which has not reached its expiration date to be overwritten, this expiration is most significant when a tape management system is used. The Retention/Expiration used by ABR depends on the type of backup taken, the parameters specified on the DUMP control statement, and the JCL, as detailed below.

**CONTROL STATEMENT** If RETPD=nnnn is coded on the DUMP control statement, it overrides all other Retention/Expiration specified. The expiration date calculated will be applied to both copies of the backup.

**JCL** If RETPD is not coded on the DUMP control statement, ABR checks the TAPEX and TAPEXX DD statements for LABEL=RETPD=nnnn or LABEL=EXPDT=yyddd. If coded, ABR will use the specified Retention Period or Expiration Date. Each TAPE DD may have its own Retention Period or Expiration Date specified. Special Expiration Dates may be coded. For example, under some tape management systems, LABEL=EXPDT=99000 will cause a tape to expire when it is no longer cataloged.

**ARCHIVE DUMPS** If the retention is not specified on the JCL or control statements, ABR will default the Retention Period to 365 days for an ARCHIVE DUMP operation. The calculated or specified expiration date will be recorded for each backup copy in the ARCHIVE Control File, and is used to determine from which copy of an archive to restore and during reorganization to identify archive entries which can be purged.

**INCREMENTAL DUMPS** If the retention is not specified on the JCL or control statements, ABR will determine the retention according to the following rules.

ON TYPE=FDR or if a full volume dump is forced, ABR will use the Retention Period that was specified for this disk volume in the ABR model on the disk (set with program FDRABRM or the ABR ISPF panels).

ON TYPE=ABR, ABR will set the expiration date for this incremental backup so that it expires on the same day as the FDR (full volume) backup that began the current generation. If this date is lower than or equal to today's date, ABR will force a full volume (FDR) dump unless DATEP=NONE is coded on the DUMP TYPE=ABR control statement.

ON TYPE=DSF, ABR will set the expiration date for this backup so that it expires on the same day as the FDR (full volume) backup that began the current generation. ABR will not force a full volume (FDR) dump if the current generation is expired.

Expiration dates are not recorded or used by ABR for incremental backups except as noted in the paragraphs preceding. ABR is not aware of the expiration date of any individual backup. However, ABR can restore from any incremental backup which is still cataloged and which has not been overwritten. ABR will uncatalog backups based only on the number of generations for which a volume has been initialized in the ABR model DSCB; tape management systems may uncatalog ABR backups when they reach their expiration dates.

**ALL DUMPS** ABR supports expiration dates beyond the end of the 20th Century. For backups, expiration dates up to 2155.365 are supported. For archive expirations up to 2027.365 are accepted.

## 52.08 DISASTER RECOVERY

This section details two procedures for recovering data from ABR full and incremental backups after a disaster. These procedures may be used to recover all or a critical subset of your data at a disaster recovery site, and may also be used when you move back to your restored prime site. These procedures may also be useful when you are simply moving to a new data center location.

The first procedure, full-volume recovery, recreates entire disk volumes on disks at the new site. This is the most efficient way of rebuilding your data. However, it does require that the new site have a disk volume of the proper type and size (or larger) for each disk you plan to recover. If the site has disks of different types or smaller disks or a fewer number of larger disks, you may not be able to use full-volume recovery for your entire installation. However, you will still probably want to full-volume recover certain critical volumes, such as those required to IPL your operating system.

The second procedure, dataset recovery, is used to restore the latest copy of individual datasets from the full and incremental ABR backups. This procedure allows you to restore selected datasets to new volumes, even if the new volumes are smaller or larger than the original volumes (as long as individual datasets will fit on the selected volumes). This can even be used to restore to a different device type (such as 3380 to 3390) if the original device type is not available; however, this is not recommended since it is less efficient and has restrictions.

**A third procedure, Application Backup, is discussed in [Section 51.20](#). Application backup uses backups that are created by steps that can be imbedded in application jobstreams, and are independent of the ABR full and incremental backups.**

**REQUIRED  
RESOURCES**

The disaster recovery procedures assume that several resources were stored in some offsite storage location and are available at the disaster/recovery site. Please review this list carefully to be sure that you will not be missing some required item:

- 1) Copies of all of your ABR full-volume and incremental backups. These are usually the COPY2 backups produced by ABR using the TAPExx DD statements, but they may also be copies (COPY2 through COPY9) produced by FDRTCOPY ([See Section 10](#)). At least the most recent full-volume backup of each required volume must be in the offsite storage, plus as many of the subsequent incremental backups of those volumes as possible.
- 2) A backup of a system residence volume (SYSRES) which is configured to run on the hardware of the disaster/recovery site. Most recent versions of MVS support multiple I/O configurations, or dynamic configurations, so you may be able to use your normal SYSRES.
- 3) A separate backup of the ABR catalog produced by FDRDSF or by ABR DUMP TYPE=DSF, after all daily ABR runs are complete (for safety, send 2 copies of this backup offsite). **Do not depend on the backup of the ABR catalog made by normal ABR incremental backups, since this will be taken before all ABR backups have been recorded.**
- 4) A hardcopy of the ABR catalog, produced by program FDRABRP, using the command PRINT CATLG ([See Section 53](#)). This will serve as the ultimate backup if the ABR catalog backups are unusable, and can help you prestage the required tapes. If you must do SAR restores it will identify the volumes containing the latest full-volume backups.
- 5) A tape containing SAR (the Stand-Alone-Restore program of FDR). It will be easiest to IPL SAR if the SAR tape is an unlabeled tape, but a labeled tape can also be used, or a copy of the FDR distribution tape from Innovation which contains SAR as file 1. [See Section 30](#) for instructions on generating a SAR IPL tape.
- 6) A tape containing an IEBCOPY unloaded copy of the ABR program library may be required if you are going to use an operating system provided by the disaster recovery site to do the restores, since they may not have a current copy of FDR or ABR available.
- 7) The tape containing the FDREPORT extract file produced daily, if you are using the dataset recovery procedure described later in this section.
- 8) Separate backups of other special-purpose data, such as tape management system data bases, using special utilities, may be required to successfully restore data with ABR; however, we suggest that you do not activate tape management or security systems until the ABR restores are done.

The more frequently these resources are sent offsite, the more current the offsite information will be, and so the more current your system will be after restoring at the disaster/recovery site. The expense and effort of sending data into offsite storage must be evaluated by each installation versus the impact of having back-level data after disaster recovery.

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## 52.08 CONTINUED . . .

**FULL VOLUME  
RECOVERY**

The following procedure may be used to recreate entire DASD volumes from the ABR full-volume and incremental backup tapes, in order to recover an entire installation or a critical subset of it.

- STEP 1** This creates an IPLable version of your operating system. You can skip this step if the recovery site provides you with a starter Operating System adequate for ABR restores.

Do Stand Alone Restores (SAR) of the system residence volume, any other volumes that you need in order to IPL (such as paging and spool volumes, and volumes containing LPA and linklist libraries) and the volume containing the ABR program library. The input to each Stand Alone Restore is the most recent full-volume backup (TYPE=FDR) for that volume. This step will not necessarily restore the volumes to the most current level, but at this stage you are just trying to get a system you can IPL. Remember that the system residence volume you restore must be one that supports an I/O configuration that will run on the disaster/recovery site hardware; this is not necessarily your normal SYSRES.

- STEP 2** IPL the operating system (either the system you just restored, or the starter system provided by the site).

If the system you have IPLed does not contain a current ABR program library, create that program library. You can reinstall the ABR library from the ABR distribution tape (following the instructions in [Sections 90](#) or [92](#)) if you have an offsite copy of that tape, or you can restore an IEBCOPY unloaded copy of that library if you have sent that offsite. The ABR library must be an APF authorized library.

- STEP 3** Next, the ABR catalog must be restored and made available to the system on which you will do the restores.

If the master catalog of that system already contains the FDRABR alias or a catalog by the name of your catalog, it may be necessary to delete it with IDCAMS with this input:

```
DELETE    FDRABR      ALI AS
EXPORT    catal ogname DI SCONNECT      (for an ICF catalog)
```

Now the separate FDRDSF or ABR backup of the ABR catalog can be restored, to some DASD volume which does not currently contain such a catalog. DSF will allocate the catalog on that volume; if it is an ICF catalog it will also IMPORT CONNECT it in the master catalog of the running system. The JCL to do this restore will look something like this example:

```
//RESCAT      EXEC    PGM=FDRDSF
//SYSPRI NT    DD      SYSOUT=*
//DI SK1       DD      VOL=SER=vvvvvvv, UNI T=SYSDA, DI SP=SHR
//TAPE1        DD      DSN=catal og. backup. name,
//              VOL=SER=seri al , UNI T=TAPE, DI SP=OLD
//SYSI N       DD      *
               RESTORE TYPE=DSF
               SELECT DSN=catal ogname
```

If your catalog is an ICF catalog, you just need to redefine the FDRABR alias with:

```
DEFI NE      ALI AS(NAME(FDRABR)  RELATE(catal ogname))
```

Note: you will also need to define the ABR scratch alias (#) if you have the ABR DADSM pre-processing exit installed on this system.

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## 52.08 CONTINUED . . .

- STEP 4** Use the ABR full-volume restore function to reconstruct all of the required volumes at the most current level, using job steps similar to:

```
//RESTVOL      EXEC   PGM=FDRABR
//SYSPRI NT     DD     SYSOUT=*
//DISK1        DD     VOL=SER=nnnnnn, UNIT=SYSDA, DISP=SHR
//SYSIN         DD     *
                RESTORE  TYPE=FDR, CPYVOLID=YES, DYN TAPE2
                SELECT   VOL=vvvvvv, COPY=2, NVOL=nnnnnn
```

The ABR full-volume restore function will automatically recreate each volume exactly as it was at the time of the most recent incremental backup. It reads that most recent incremental backup first, restoring the VTOC and all other data on that backup, then reads backwards through the earlier incrementals until it reaches the full-volume backup that started the current generation, restoring only the data required from each backup. Unlike some competing products, in ABR there is no need to separately “apply” incrementals; the entire restore is done by the above step.

The output volumes do NOT have to be pre-initialized to the volume serials of your original volumes, nor do they have to be initialized for ABR. NVOL=nnnnnn specifies the current volume serial of the disk that will be overlaid by the restore of your volume “vvvvvv”. CPYVOLID=YES will cause that volume to be renamed to your volume serial after the restore completes. Many disaster/recovery sites will guarantee that their disks will be initialized to a certain set of volume serials before you arrive; you can then plan that each one of your volumes (vvvvvv) is to be restored to a selected one of their serials (nnnnnn). The restore JCL must include a DISKxxxx DD specifying the output disk volser.

Change COPY=2 if COPY2 is not the copy you keep in your offsite storage.

The ABR model on each volume to be restored is not available (since the disks have not yet been restored), so ABR will locate the most recent incremental backup of the disk volume in the ABR catalog which you have just restored. ABR will then read that incremental backup, followed by each preceding incremental backup, and finally the full-volume backup which begins the current generation. Once this process is completed, the volume will look exactly as it did at the time that the latest incremental backup was taken. If there are certain volumes for which you want to restore only the most recent full-volume backup, add “GEN=CURRENT,CYCLE=00” onto the SELECT statement.

The DYN TAPE2 option specifies that ABR is to dynamically allocate 2 tape drives for restoring each disk volume, to improve performance. If you do not have enough tape drives to support the number of concurrent restores you want to do, change DYN TAPE2 to DYN TAPE, which will allocate only one drive. If the backup tapes required for a given disk are in use by another restore job, ABR will wait for them to become available as long as you have the WTVOL option enabled in the ABR option table ([See Sections 91 and 92](#)). Use of DYN TAPE2 or DYN TAPE is strongly recommended, since without it ABENDs may occur if the same tape is required by 2 concurrent jobs.

You can restore more than one volume in an ABR step (by specifying more than one SELECT statement), but those volumes will be restored one at a time, so it is easier to simply restore one volume per step as shown above. Those steps can be organized one per job, or several steps per job. In order to be able to restore a large number of volumes in minimum time, you will need to have multiple ABR restore jobs executing at once. Any number of concurrent ABR restores can be executing, limited only by the number of available tape drives. Performance may be reduced if the capacity of the tape or disk data paths is exceeded.

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**52.08 CONTINUED . . .**

However, since incremental backups will almost always put data from several disks on one tape, concurrent restore jobs will often contend for the same tape, causing one or more to wait. The recommended way to avoid this is to divide the restores into groups of disk volumes, creating restore jobs which contain multiple ABR steps, each restoring one disk volume. The disk volumes in each restore group should be selected so that they will usually not be requesting the same backup tapes required by another restore group; this can be done in several ways:

1) the best way is to setup your normal ABR backup jobs to select disk volumes by the same groups. In other words, there will be a backup job which processes a given set of disk volumes, and a restore job which restores those same volumes, one at a time. Since the backup tapes used for one volume group will never overlap those used for another group, there will never be tape contention.

2) Another option would be to simply divide the volumes to be restored into groups based on the order in which they are selected for processing by your normal ABR backup jobs. For example, the first 10 volumes which ABR normally selects might be restored by one restore job, the next 10 by the next restore, etc. This will minimize contention but cannot totally eliminate it.

**STEP 5** If you used STEP 1 of this procedure, then you used SAR to restore the IPL volumes from ONLY the full-volume backup tapes, so some datasets on those volumes might be back-level. If this is a problem, then you must restore those volumes again with ABR. Since you are currently running your system from those volumes, the ABR restores must output to a different set of volumes; after the restores are complete, be sure that you place the original SAR-restored volumes offline and IPL using the new versions of those volumes (the IPL procedure will allow you to choose between two identically labeled volumes).

**STEP 6** The volume that you must restore last is the volume containing the ABR catalog. This restore cannot be run concurrently with the other restores because it may temporarily downlevel the catalog. When this full-volume restore is finished, repeat the restore of the ABR catalog that was done in Step 3, to return the ABR catalog to the most current level. It is not necessary to delete the ABR catalog; the restore JCL in STEP3 will simply overlay the existing catalog.

You have now completed the full-volume recovery procedure. If you are recovering all your data with full-volume recovery, you are done. If not, you can now proceed with data set recovery (as described next in this section), Application restore ([Section 51.24](#)), and/or other recovery procedures.

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## 52.08 CONTINUED . . .

**DATASET RECOVERY**

The following procedure may be used to restore individual datasets or groups of datasets from ABR full and incremental backup tapes. It can be used when you don't want to restore all of the datasets on those backups, or when you must restore datasets to volumes other than their original volumes because:

- \* the recovery site has volumes of different sizes, such as 3390-3s instead of your 3390-2s
- \* the recovery site has fewer volumes, requiring selective restores.
- \* the recovery site has disks of a different type, such as 3390s instead of your 3380s

Note that the last reason, which requires "unlike device" restores, has some limitations; please review [Sections 52.14, 52.15](#), and member UNLIKE in the FDR ICL library for details. Unlike restore should be avoided if at all possible.

Dataset restore at a recovery site requires that some additional information be saved as part of your daily backups. Normally, information about the backups of individual datasets is stored in the DSCB of the dataset itself on disk. The ABR catalog contains the locations of the backup datasets created by ABR, but does not record information about the individual datasets in those backups. For disk volumes which have not been restored by the full-volume recovery process just described, ABR does not know where to find an individual dataset.

However, if you tell ABR where to find a backup, specifying the disk volume, generation and cycle, e.g.,

```
SELECT      DSN=dsname, VOL=vol ser , GEN=generati on, CYCLE=cycl e
```

ABR can locate the backup and restore the dataset.

FDREPORT, the ABR generalized report writer described in [Section 53](#), can build a "data base" which will contain the location of the latest backup of every dataset in your system (or a subset of them if you wish). At the recovery site, you can then run FDREPORT against that data base to build SELECT statements as shown above to instruct ABR to restore selected datasets.

**BUILD THE DATA BASE**

This jobstream should be run after ALL of your ABR full-volume or incremental backups are run each day, to build the data base which contains information about the current backup of datasets, but it should be run BEFORE the backup of the ABR catalog, since the data base file name starts with FDRABR and will be cataloged in the ABR catalog. The sample jobstream shown will gather information on every dataset on every online disk volume in your installation. You can insert XSELECT and/or XEXCLUDE statements ([See Section 53.25](#)) to limit the datasets it processes, or to limit the volumes it processes. You could also run several such jobs to build data bases about various subsets of your datasets. SYSUT2 is the database file, on tape so it can be sent offsite; it can be a GDG if you like.

```
//DATABASE EXEC PGM=FDREPORT, REGION=2M
//SYSPRINT DD SYSOUT=*
//ABRMAP DD SYSOUT=*
//SYSUT2 DD DSN=FDRABR.OFFSITE.DATABASE,
// UNITS=TAPE, DISP=(,CATLG),
// DCB=(BLKSIZE=32760, BUFNO=10)
//SYSIN DD *
* INSERT XSELECT/XEXCLUDE STATEMENTS HERE IF NEEDED
REPORT FIELDS=(DSN, VOL, ABRGEN, ABRCYCLE)
PRINT ONLINE, RPTYPE=DATA, DISABLE=INFOMSG
* GENERATE REPORT FROM EXTRACTED DATA
DEFAULT SORTALLOC=YES
REPORT FIELDS=(DEFAULTS, ABRGEN, ABRCYCLE)
SORT FIELDS=(DSN, VOL)
PRINT DATATYPE=EXTRACT
/*
```

Naturally, the data base tape(s) and the printed reports should be sent to your offsite storage with your other backups.

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## 52.08 CONTINUED . . .

### RESTORING DATASETS

At the recovery site, FDREPORT is used to read the “data base” and generate SELECT statements for any datasets you wish to restore. These SELECTs are passed to an ABR restore step which will allocate the proper backup tapes and restore the datasets. The target volumes for the restores can be specified by NVOL parameters on the SELECTs (as shown in the example below) or by the ABR RESTORE ALLOCATE LIST ([See Section 91.05](#)). FDREPORT XSELECT statements can be used to select a subset of the datasets on the data base so that multiple restore jobs can be run concurrently.

The user catalogs in which these data sets are cataloged must be restored before this job stream is run. The RECAT and VRECAT operands will update those catalogs to point to the volumes to which the data sets were restored.

```
//SELREST      EXEC    PGM=FDREPORT, REGI ON=2M
//SYSPRI NT     DD      SYSOUT=*
//SYSUT2        DD      DSN=FDRABR. OFFSI TE. DATABASE, DI SP=SHR
//SYSPUNCH      DD      DSN=&&ABR, UNI T=SYSDA, SPACE=( TRK, ( 5, 2) ),
//              DI SP=( , PASS)
//SYSI N        DD      *
XSELECT        XDSN=PAYROLL. **      ** select all PAYROLL datasets
PUNCH          FDRLI B=MASK          ** punch mask for ABR statements
PRI NT         DATATYPE=EXTRACT, RPTYPE=SELPCH
/*
//MASK          DD      *
) PREFI X
  RESTORE      TYPE=ABR, DYNTAPE, RECAT, VRECAT, COPY=2, MAXCARDS=2000
) ENDPREFI X
  SELECT       DSN=<DSN>,
              VOL=<VOL>, GEN=<ABRGEN>, CYCLE=<ABRCYCLE>,
              NVOL=PROD*
/*
//ABRREST      EXEC    PGM=FDRABR, REGI ON=2M
//SYSPRI NT     DD      SYSOUT=*
//SYSI N        DD      DSN=&&ABR, DI SP=( OLD, DELETE)
```

Even though you may be requesting many datasets from many different backup tapes, ABR will sort the requests so that each backup tape is mounted only once, if possible, and multiple datasets will be restored from a given backup file in one pass of that file, even if the outputs are going to multiple disk volumes.

Note that ABR always restores datasets to the same number of volumes they originally occupied, even if the output volumes are larger or smaller than the original volumes. For example, a 3-volume dataset must be restored to 3 volumes, occupying the original amount of space on each volume. Likewise, a single-volume dataset must be restored to a single volume and cannot be split across volumes. Restoration of large datasets will fail if they cannot be allocated on an appropriate number of volumes. If your installation has datasets which occupy entire 3390-3s, for example, they cannot be restored to a 3390-2.

**Note:** Application Backup, previously documented in this section, has been moved to [Section 51.20](#).

**52.09 ABNORMAL TERMINATION PROCEDURES**

This section discusses what should be done if an ABR BACKUP, ARCHIVE or RESTORE operation abnormally terminates. The solutions are generalized and are not intended to cover every situation. Discretion should be used and if you are in doubt concerning what has occurred or the procedure to follow, contact INNOVATION for assistance.

**What should you do if an archive operation abnormally terminates?** ABR is designed to first backup all the data sets on the volume to be ARCHIVED. After a successful backup, ABR will record these data sets in the ARCHIVE Control file. The next step is to scratch and uncatalog

(or recatalog for auto-recall) the data sets. Since the data sets are not modified until they have been backed up and recorded, you can just resubmit the ARCHIVE job after an abnormal termination. The volumes which were completed will usually have no data sets selected. The volume which was in the process of ARCHIVE will select all of the same data sets again if they were not scratched in the previous run. The remaining volumes will proceed normally.

NOTE: The backup tapes from the run that abnormally terminated must be kept, in case the run had reached the point of scratching any data sets.

**What should you do if there is an ABEND in the middle of an ABR backup?** On each disk volume, ABR does not reset update flags until the volume's backup is complete and it is recorded in the ABR catalog. Suppose ten volumes are being dumped in one jobstep and an ABEND happens on the sixth dump. Suppose that the first four backups have been completed successfully; the backup files have been recorded in the ABR catalog and the update bits have been turned off in the DSCBs. The fifth backup is in progress on another tape drive. The backup for the sixth disk begins, and when it attempts to OPEN the tape, an I/O error occurs, causing an S613 ABEND. This does not abend the jobstep; it only terminates the backup for that volume. Other backups in the same jobstep are unaffected, whether they have already completed, are running concurrently, or have not yet started. The ABR SYSPRINT listing will contain an FDR319 message with the completion code for the sixth backup. No tapes will be cataloged for that backup and no update bits will be turned off for that volume. This would apply even if the backup had run for a while and dumped a portion of the pack, and then blew up, for example, with an S137 ABEND.

Following the failure of the backup for this volume, ABR will proceed to the next disk. ABR will call for a fresh scratch tape on the drives associated with the failing backup, and will backup the remaining disks in a completely normal manner.

ABR messages on SYSPRINT will indicate which volumes completed successfully and which failed. ABR will end with the message FDR998 COMPLETED WITH ERRORS and a condition code of 12. It is essential that the operator or somebody else look through the listing to see what the specific error was. In the above example of an I/O error while OPENing the tape, no corrective action is needed before re-attempting the backup. On the other hand, if the ABEND was issued by the backup program because of an excessive number of I/O errors on the disk, there would not be much point in retrying the backup until the disk is fixed.

There are some error conditions which will terminate ABR immediately, indicated by the entire ABR step abending. Check the ABEND code and any diagnostic messages printed to identify and correct the error. Call INNOVATION if you need assistance. Any disk volumes for which successful completion messages were NOT printed were not dumped.

One way to rerun ABR when one or more backups have failed and others in the same step have completed is to resubmit the ABR run and select only the disks remaining to be dumped. Either omit or DUMMY out the other DISKxxxx DDs, or insert EXCLUDE ALLDSN,VOL=vvvvvv commands for all of the volumes successfully processed. ABR will then process only the pack(s) that previously failed.

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## 52.09 CONTINUED . . .

For incremental (not full-volume) backups, it also OK to put the run back in with the original JCL unchanged. For each pack for which the previous backup was successful, ABR will dump only the VTOC (plus the other data sets that are always backed up, as specified in [Section 52.02](#), plus data sets that were updated between the two runs). Data sets that were backed up in the earlier run will not be backed up again, because their update bits were turned off after the first backup. (However, ABR will increment the cycle number on these packs. This may cause problems with TYPE=AUTO forcing a full volume backup earlier than expected, unless AUTOUPD=NO is specified on the rerun.) On the pack for which the original backup failed, ABR will take a normal backup. Even if it dumped some of the same data sets in the first run on that pack, it will dump them again, because the first run didn't count and the update bits were not turned off.

**What happens to pending requests if the system crashes while ABR is doing backups, ARCHIVES, or restores that were requested through the remote queue?** Backups, ARCHIVES or restores that were completed before the crash are not affected. Backups, ARCHIVES or restores that were not completed will have to be re-requested by the users using the TSO/ISPF Panels or with program FDRABRUT.

Explanation: ABR reads the remote queue data set (ABRARCH for restores from ARCHIVE, ABRREST for restores from backup, ABRARDQ for ARCHIVE, ABRBKDQ for backups) at the beginning of the operation, constructs internal tables, and immediately resets the data set to empty. This minimizes the time that the data set is not available for users to add new requests.

If the system crashes, ABR's internal tables are lost.

Note: The above answer always applies to RESTORE requests, but it only applies to BACKUP or ARCHIVE requests if the program FDRABRUT is processing them by adding control statements to the remote queue data sets. If FDRABRUT is processing BACKUP or ARCHIVE requests by setting indicators in the DSCB, then if the system crashes while ABR is in the middle of a backup or ARCHIVE operation, the request will remain pending for the next backup or ARCHIVE run.

**52.10 FDR/DSF/CPK/ABR I/O ERROR RECOVERY****TAPE I/O  
ERRORS**

FDR may encounter tape I/O errors, especially on marginal quality tapes. FDR always writes out highly blocked information to the tape. The records on tape are undefined format with lengths that vary from 20 bytes to 56K. FDR is more likely to encounter permanent data checks than ordinary programs are, especially on marginal tapes. INNOVATION offers a product, FATS, which can be used to certify tapes on your tape drives and reduce the likelihood of this problem (this is a plug).

Since normal access methods (usually BSAM) are used to read and write backup datasets in FDR, DSF, CPK, and ABR, the Operating System's Error Recovery Procedures (ERPs) will be used to automatically attempt to recover from any tape errors. If this recovery is successful, the program is not even aware that the error occurred. If the error is permanent, the FDR system contains recovery routines which complement and extend the ERPs.

**TAPE ERRORS  
DURING DUMP**

On a backup or ARCHIVE operation, the FDR system will force a new output tape to be mounted when a permanent error is encountered writing a tape block. A new volume is requested using FEOV (Forced End of Volume), and one or more tape blocks (including the block in error) are rewritten as the first blocks of the new tape. The program issues messages FDR200 and FDR201 to tell you that the error happened. Message FDR200 contains SYNADAF information that identifies the type of error. The program will then continue with the dump procedure.

A maximum of 20 I/O errors can be recovered before terminating the dump, unless overridden by the MAXERR= keyword. If that maximum error count is not exceeded, the dump will complete; the backup can probably be restored successfully, but FDR, DSF, and CPK will terminate with a U0888 ABEND (and COMPAKTIONS will be bypassed), and ABR will set a completion code 12 at termination, in order to draw attention to the errors (if this is not desirable, code TAPERRCD=NO on the DUMP TYPE= statement). A backup which forced an end of volume may cause problems for the STAND ALONE RESTORE (SAR) program. Dumps will immediately terminate if the error occurs during the write of the FDR control records at the beginning of the tape.

NOTE: A dump terminates immediately on a 3480 tape cartridge subsystem if a data check or other error occurs. The reason for this is that FDR cannot determine the exact block which caused the error since the 3480 buffers the I/O. Also, we have discovered that most 3480 cartridges which have permanent I/O errors will cause ABENDs during the FEOV due to I/O errors on the labels.

**TAPE ERRORS  
DURING  
RESTORE**

If a permanent I/O error is detected during a RESTORE or COMPAKT operation, the program will issue message FDR200 or CPK502E, giving the SYNADAF information. If the block in error is an FDR control record the program will immediately terminate. If the block in error is a data block, FDR will continue processing with the next block of data. A maximum of 20 blocks will be bypassed before terminating the restore unless MAXERR= is coded. The block in error may contain one or more tracks of data. These tracks will not be restored. If the block number in the SYNADAF message matches the block number in a SYNADAF message that appeared during the dump, data should not be lost since FDR has duplicated this block on the next tape.

Even if a tape block is successfully read, its length is compared to an internal length field, in order to detect blocks which may have had undetected I/O errors, or which have been shortened by some other program. A block with a length error will be bypassed, just like a block with an I/O error. **Tapes created by the FDR system should be copied only by the FDRTCOPY utility (See Section 10) or FATAR, a separate program product from Innovation. Because they contain blocks over 32K in length, utilities such as IEBGENER will not copy them correctly, resulting in block length errors.**

An FDR366 or CPK582E message is issued at the end of a restore specifying the tracks, if any, that were lost. On a DSF or ABR data set restore, message FDR155 specifies the data set to which the missing tracks belong. FDR, DSF, and CPK will issue a U0888 ABEND and ABR will set a completion code 12 at the end of the restore to draw attention to the error, whether or not tracks needed for the restore were lost. If you code TAPERRCD=NO on the RESTORE TYPE= statement, the error terminations will occur only if required tracks were really lost.

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## 52.10 CONTINUED . . .

**TAPE SWAPPING**

Use of the Operating System SWAP facility will prevent the FDR system's error recovery routines from being entered. Therefore, we recommend that SWAP should not be used with FDR/DSF/CPK/ABR.

**The operators should be instructed that they should never give permission for SWAP on FDR, DSF, COMPAKTOR or ABR.** They should always reply 'NO' to message IGF500D, on either a DUMP or a RESTORE. That way, the program will be notified of the error and will take corrective measures, as described above.

Allowing the system to do a SWAP during an FDR/DSF/CPK/ABR run is undesirable because it is liable to result in duplicate or missing blocks. During a SWAP, the system unloads the tape from the drive where it had an error and mounts it on a different drive. The system tries to reposition the tape using the block count from the DCB; we have found this repositioning to be unreliable. Because the program is not informed of the error, you do not get the FDR200 or CPK502E message. It is also likely that the user will not even realize that a SWAP is involved in the problem, because SWAP messages IGF500I, IGF502E, and IGF505I are not printed with the console messages in the job log at the beginning of the SYSOUT.

**DISK I/O ERRORS**

The FDR system uses its own CCW chains to read and write disk tracks. In many cases, Operating System Error Recovery Procedures (ERPs) are allowed to recover from disk I/O errors. However, our own ERPs are often used in place of the system ERPs because of the unique nature of the I/Os we issue. Many errors are retried many times or in various ways in order to read or write the data if at all possible. If all recovery fails, the error will be reported in a message so that you can take appropriate action.

There are various I/O error messages, depending on where the error is detected and what type of I/O FDR is doing, but they are usually followed by a FDR DIAGNOSTIC MINI-DUMP. This mini-dump formats a number of control blocks and other information, such as the IOB, DEB, DCB, UCB, and CCWs. The format of these can be found in various IBM manuals, but there are several significant pieces of information that may help you decipher the error condition:

- 1) the IOB contains 2 important fields: bytes 2 and 3 (last two bytes of the first word) contain sense data from the disk, which can be found in the appropriate control unit (such as 3880 or 3990) hardware manual; bytes 8-15 (the 3rd and 4th words) contain the CSW (channel status word), which is defined in the Principles of Operation manual for your system.
- 2) in the CCW printout, the CCWs for the current I/O are printed in a vertical table; CCW(—0) is the failing CCW; above it are the CCWs which preceded it (CCW(—n)); below it are CCWs which were not executed (CCW(+n)). The definition of the CCWs is found in the control unit hardware manual.

**DISK ERRORS DURING DUMP**

Permanent I/O errors on disk while dumping usually result in disk tracks not being dumped, since the FDR system could not read the track having the error. Even if some data could be read from a track, a partial track will never be dumped. Most I/O errors will result in one disk track being bypassed, but some errors affect more than one track; look up the I/O error message at the top of the mini-dump in [Section 80](#) for details. When a track is bypassed because of an I/O error, a "dummy" entry is written to the backup tape in its place, so that a restore from that tape will know why it is missing (a warning message FDR150 is issued during a restore when such a missing track is encountered).

A maximum of 20 disk I/O errors can occur before the dump is terminated, unless the MAXERR= keyword is specified. If that maximum error count is not reached, FDR, DSF, and CPK will terminate with a U0888 abend, and ABR with a completion code of 12, to call attention to the errors; the backups will definitely be missing some tracks. The I/O error messages will contain a cylinder and track number, which you can use to determine which datasets are affected, by comparing it to a map of the volume.

I/O errors reading the VTOC or VVDS will usually make the backup unusable.

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## 52.10 CONTINUED . . .

**DISK ERRORS  
DURING  
RESTORE**

Permanent I/O errors writing to disk usually affect just one disk track. The track involved (identified by cylinder and track number in the I/O error message) may have partial data written to it, or none at all. Use that track ID to determine the dataset affected.

**INVALID  
TRACK  
FORMAT**

“Invalid Track Format” is an often-reported I/O error which is not really an I/O error. A disk track has a fixed maximum capacity, which varies by device type. If an application or access method erroneously tries to write more data on a track than it will hold, the last record on the track is only partially present. During that write, the disk will indicate the “invalid track format” I/O error, but that partial last record may be left on the track. When it is read back by the FDR system, the same “invalid track format” is reported by the disk. It is really reporting a logical data error, caused by a programming error or Operating System bug.

“Invalid Track Format” can be recognized when the sense from the disk (the last 4 digits of the first word of the IOB in the FDR mini-dump) contain X '0040'. This error most frequently occurs in Partitioned Data Sets (PDSs). If so, it is possible that the error is not really in any real member, but is in dead space between members. The easiest way to tell is to copy the PDS with IEBCOPY; if no errors occur, the backup of the PDS is clean.

If you can be sure that the track getting the “invalid track format” does not contain any useful data, you can make the error go away with the IBM utility ICKDSF with the command:

```
INSPECT TRACKS(X 'cccc',X 'hhhh') NOPRESERVE
```

where cccc and hhhh are the cylinder and head of the bad track.



**52.11 ICF VSAM SPECIAL CONSIDERATIONS**

This section explains some of the special considerations that a user should be aware of when dumping or restoring VSAM Clusters which reside in ICF catalogs.

There are special rules and considerations for multi-volume ICF clusters. If multi-volume clusters are involved, be sure to read Multi-Volume VSAM Considerations at the end of this section.

**WHAT FDR  
DUMPS**

FDR, DSF and ABR will backup ICF VSAM Clusters. All of a cluster's associated components which reside on a single volume will be dumped. This includes the index, data, alternate indexes, key ranges, etc. In addition, FDR will format the VVR information contained in the SYS1.VVDS data set for each cluster at the beginning of the backup. The only information FDR does not have available is information exclusively maintained within the catalog. This includes the PASSWORD or RACF Protection, Candidate Volumes, and PATH names for Alternate Indexes. These fields are not recorded by FDR and will not be restored. On non-SMS-managed volumes, the expiration date is also only in the catalog and is not restored; on SMS volumes, the expiration date of ICF clusters is restored.

FDR dumps VSAM files by track image, which is the same technique used for every other type of file. FDR is not access method oriented. If logical errors exist within the file, they will not be detected by FDR. However, certain types of errors within the VVDS data set will be detected and reported.

For DSF and ABR data set backups, SELECT statements should select ICF VSAM clusters only by the base cluster name, never by individual component names or alternate index cluster names. If component names are specified, the VVDS information will not be recorded, and the restored component will not be usable. However, COMPAKTOR SELECT statements, which may be used to position ICF VSAM components, will accept ONLY component names.

**VSAM  
TIMESTAMP  
EXIT**

On MVS systems with a level of DFP (Data Facility Product) below Version 3, the update flag and last reference date used by ABR are not set when ICF VSAM clusters are opened unless an IBM user exit (IDATMSTP) is modified or replaced. INNOVATION provides such a modification; Section 90.12 details how to install our modification. The modification is not necessary if another product (such as DFHSM) has already modified or replaced the exit. DFP V3 and above record the update flag and last reference date for all data sets as a standard feature.

If this modification has been made by INNOVATION or another product, you must inform ABR that this recording is active in the system. This is done by enabling the option ICFSU60 with program FDRZAPOP ([Section 91](#)) or the ABR/ISPF panels ([See Section 92](#)). This option, ICFSU60, may also be specified on the DUMP or SIM command. If this option is NOT enabled, then ABR incremental backup will ALWAYS backup ICF VSAM files (since it cannot tell if they have been updated), and ABR ARCHIVE and SUPERSCRATCH will NEVER select ICF VSAM files based on last reference date (ADAYS= and ADATE=), although they can be selected by other criteria or by SELECT statements.

ICFSU60 will be assumed by ABR if executing on a system with DFP V3 or above.

**WARNING:** This information will only be recorded on the first volume of the data component of the non-keyrange base cluster. The index, alternate indexes and key ranges (all volumes) will not have the update indicator or reference date recorded. (Recording will be done for the alternate index data component only when it is created).

**ABR  
INCREMENTAL  
BACKUPS**

ABR incremental backup will select ICF VSAM clusters when ICFSU60 is enabled (see above). If the update flag is on for any component of a cluster, ABR will backup all of the associated components which reside on the volume being dumped. If ICFSU60 is not enabled, all ICF VSAM clusters on the volume will be dumped; this can be overridden by the NOVVSAM option on the DUMP or SIM statement, but even this will not prevent ABR from backing up any ICF VSAM clusters which have an update flag on. ICF VSAM can be totally excluded only by a statement such as:

```
EXCLUDE ALLDSN, DSORG=EF
```

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## 52.11 CONTINUED . . .

**ABR ARCHIVE  
AND  
SUPERS-  
CRATCH**

ABR can ARCHIVE or SUPERSCRATCH ICF VSAM Clusters. VSAM clusters can be selected manually (SELECT statement) or by automatic criteria such as ADAYS=. For the options ADAYS= or ADATE=, ABR will only use the last reference date stored in the data component of the base cluster, and only if the ICFSU60 option is enabled (see above).

The keywords IFNOTCAT, EXPIRED, MAXGDG= and NOPASS do not apply for VSAM clusters and are ignored. If the SIZE= operand is specified, this size is checked against each of the components; if any component exceeds the size specified, the entire cluster will be archived.

If VALIDATE is specified, ABR will check both the cluster name and component names; if any of the names fail the validation, the entire cluster will be selected.

The operator will not be given message FDRW23 on unexpired VSAM Clusters. If the VSAM Cluster is not expired, ABR will not scratch the cluster unless VEXPD=NONE or EXPD=NONE is specified on the DUMP control statement.

The ARCHIVE Control file will record the cluster name and each of its component names.

ABR will print an FDR314 message for each of the components selected, and when the last component for the cluster is printed, ABR will print an FDR314 message for the cluster name.

A cluster is not scratched until the last component name is selected.

**VSAM  
RESTORE  
RULES**

For FDR and ABR full-volume restores, the VVDS and all VSAM components are, of course, restored. It is the user's responsibility to be sure that the clusters are properly cataloged; no cataloging will be done by a full-volume restore.

DSF and ABR data set restores can restore ICF VSAM files from data set or full-volume backups. The base cluster name, not individual component names, is always used to select ICF VSAM files; either DSN= or DSG= may be used on SELECT statements. Once selected, all of the components of a cluster which exist on the backup (from one single disk volume) will be restored; this includes the data, index, alternate indexes and key range components. An alternate index cluster cannot be restored individually unless it resides on a volume by itself (see Multi-Volume VSAM Considerations), and even then it is selected using the base cluster name, not the AIX cluster name.

Data set restores can be "physical" or "logical". A physical restore is a "track-image" restore and is used only when the cluster is being restored to the same disk device type as the original cluster resided on; the tracks of the data set look exactly as they did when dumped, and the cluster will not be reorganized or rearranged in any way. A logical restore is used when restoring a VSAM cluster to a different device type (a "unlike" restore); the control intervals in the component will be rearranged to fit on the new device type, but the cluster will still not be reorganized. Use FDRREORG to reorganize VSAM KSDS clusters.

Logical restore may change cylinder allocated clusters to track allocated; this is normal and causes no performance problems.

NOTE: Logical restore for VSAM supports all types of ICF VSAM clusters. For current support and considerations for ICF VSAM to unlike devices, see member VSAMUNLK in the Installation Control Library (ICL).

WARNING: Because of the way that logical restore processes the control areas of ICF VSAM clusters, clusters can generally NOT be restored, copied, or moved to a smaller disk type (such as 3390 to 3380). However, a cluster which was moved to a larger disk by FDR or ABR can be moved back to its original disk type if it has not been reDEFINED since the move.

After the individual components have been restored, the VVR information in the VVDS data set will be updated for each component. Information exclusively maintained in the VSAM catalog will not be updated. This includes passwords or RACF protection, candidate volumes, and PATH names for alternate indexes; it also includes the expiration date for ICF clusters not on SMS-managed volumes. This is not a problem if the data set is being restored back into the original VSAM cluster. If you DEFINE the cluster for the restore, you should specify this information in the DEFINE. If FDR DEFINES the cluster, you should re-establish this catalog information with the IDCAMS ALTER and DEFINE PATH commands after the restore. If the cluster was protected by a RACF discrete profile, that protection must be re-established in the catalog with a RACF command.

The restore printout will report on each component name restored, giving its associated cluster name.

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## 52.11 CONTINUED . . .

**FDRCOPY of  
ICF VSAM**

An FDRCOPY disk-to-disk data set copy or move ([See Section 21](#)) is essentially a simultaneous dump and restore, so the preceeding rules for backup and restore of ICF VSAM apply. However, since the input cluster still exists during the copy, information only in the catalog (passwords, expiration date, etc.) WILL be copied to the equivalent output cluster. If the input cluster was protected by a discrete RACF profile, a discrete profile will be created for the output cluster using the input profile as a model. However, PATH names for alternate indexes will not be copied; they must be redefined by the user.

Since two ICF clusters by the same name cannot exist in the same catalog, an FDRCOPY COPY of an ICF VSAM cluster must be to a new name unless the new cluster is directed to a new catalog; these options are described in following paragraphs. A MOVE of an ICF VSAM cluster is accomplished by assigning temporary names to the output cluster and its components; they are renamed after the input cluster is deleted. [See Section 21](#) for details.

FDRCOPY supports both “physical” and “logical” copies (as detailed under Vsam Restore Rules), so clusters can be copied or moved to “unlike” disk devices.

**NEWNAME  
RESTORE**

An ICF VSAM cluster can be restored or copied/moved to a new name (NEWNAME=) or new group name (NEWGROUP=) or with new or replacement index levels (NEWINDEX=). ICF catalogs and SYS1.VVDS data sets must be restored under their original names.

If NEWNAME= is specified, this name will be used as the new cluster name. Since the component names are unknown, a LOCATE will be done to determine the associated component names for that cluster, matching each type of component (data, index, alternate index) with the corresponding component from the backup. If NEWNAME= is specified for clusters which contain more than one alternate index, only the base cluster will be correctly restored.

If the new name is not found, the cluster will be allocated, allowing VSAM to generate names for the components; the format of the generated names depends on which version of DFP (Data Facility Product) your MVS system contains; FDR will use the generated names as implied “newnames” for the components. A VSAM cluster which contains alternate indexes cannot be allocated if NEWNAME= is specified.

**INNOVATION recommends the use of NEWGROUP= or NEWINDEX= instead of NEWNAME= if the output cluster must be allocated.**

If NEWGROUP= or NEWINDEX= is specified, FDR will apply the group name or indexes to the cluster name and all of the associated components, including any alternate index clusters and their components. If any of the cluster or component names are too short or contain too few index levels, or if the generated new names are duplicates of one another, the restore will fail. If the new cluster name does not exist, the cluster will be allocated using all of the new component names. If the new cluster is pre-allocated, then all of the component names must match the new names generated by FDR.

**ALLOCATING  
VSAM  
CLUSTERS**

If the components of the output cluster are found on the output disk, such as when restoring the backup copy of an existing cluster, FDR will simply overlay the contents of the components; no allocation is required. However, a logical (unlike) restore of ICF VSAM cannot restore to a pre-allocated cluster.

If the output cluster name is not found on the target disk volume, the cluster will be allocated (see Multi-Volume VSAM Considerations). The cluster will be allocated so that each component has a primary allocation equal to the total amount of space the data set occupied when it was dumped, so a component that was in multiple extents when dumped may occupy fewer extents when restored. The primary allocation of the data component of the base cluster may be overridden by the CYL= or TRK= operands of the SELECT statement, but the value specified must be equal to or greater than its original allocation. On track or record allocated clusters, VSAM will round up to a multiple of the number of tracks in the CA. When doing a “logical” restore or copy/move to a different disk type, the allocation quantity will be adjusted.

The ICF catalog into which the new cluster will be defined depends on the ICFCAT= parameter on the RESTORE statement. If a cluster is being restored to its original name, the default is to use the cluster’s original catalog name (ICFCAT=ORIGINAL). If ICFCAT=ALIAS is specified, (or by default if NEWNAME=, NEWGROUP=, or NEWINDEX= is specified), DSF or ABR will attempt to locate the user catalog associated with the new cluster name in the master catalog; if found, this catalog will be used; if not aliased, the STEPCAT (if present) or the master catalog will be used.

ICFCAT=STPCAT may be specified to force the cluster to be defined in the STEPCAT or master catalog. ICFCAT=ORIGINAL will not be honored when restoring a cluster to a newname; to catalog a cluster into the same catalog as the original cluster when it is not the catalog that ICFCAT=ALIAS would choose, specify ICFCAT=STPCAT and provide the original catalog as a STEPCAT.

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## 52.11 CONTINUED . . .

Since ICF VSAM clusters **MUST** be cataloged at the time they are allocated, the define of a cluster will normally fail if the cluster name or any component name already exists in the catalog in which FDR is attempting to catalog the cluster. This might be the case if the cluster currently exists on another volume, or if you are restoring a cluster which does not exist on its target volume but is still cataloged. The VRECAT operand on RESTORE commands allows FDR to allocate a cluster even if it is in the catalog. VRECAT will attempt to DELETE the cluster; if that fails, a DELETE NOSCRATCH is attempted.

WARNING: To avoid leaving uncataloged VSAM components on other volumes, VRECAT will SCRATCH the cluster if it exists on another volume.

**USER  
ALLOCATED  
VSAM  
CLUSTERS**

The user may manually pre-allocate output ICF VSAM clusters using IDCAMS DEFINE prior to a restore or copy/move. **However, user allocated clusters cannot be used for a logical (unlike) operation, and usually cannot be used for multi-volume clusters or for KSDS clusters with keyranges or the IMBED option if they have gone into additional extents.**

The DEFINE must result in a cluster with the same options and characteristics as the VSAM cluster to be restored. This includes CI size, imbedded index, blocksize, type of VSAM file (ESDS, KSDS, etc.) and on and on. FDR may not be able to restore the cluster if some of the characteristics are different.

The PRINT TVTOC report ([Section 53.10](#)) can provide an IDCAMS-style listing of the characteristics the cluster had when it was backed up.

Cylinder-allocated VSAM components must be re-allocated in cylinders, while components originally allocated in records or tracks must be re-allocated in tracks. The CYLINDERS or TRACKS keyword for each component must specify the total number of cylinders or tracks that the component occupied when it was dumped. Even if the space parameters were originally specified on the CLUSTER level, they should now be specified on each component to get the space allocated correctly.

For components allocated in tracks, a secondary allocation quantity equal to the “tracks-per-CA” of the component being restored should be specified to set the CA size correctly, even if the original secondary allocation quantity was zero. For a KSDS with the IMBED option (imbedded index), subtract 1 from both the primary and secondary track quantity for the data component since VSAM will add it back.

FDR will reset the primary and secondary allocation to their original values after the restore. Should the user allocation result in a difference in allocation or characteristics, DSF will indicate which field is different with an error message. A MINI DUMP will be printed showing the VVR information from both the backup tape and disk volume.

The new allocation can be larger than the original. However, the result must be a multiple of the number of tracks in a CA for the original cluster. An error message will result if the allocated space is too small for any component, showing the required number of tracks.

EXAMPLE: The VSAM data component was allocated with a primary of 3 tracks and a secondary of 3 tracks. The data set acquired secondary allocation and now occupies 9 tracks. The number of tracks per CA is 3. TRACKS(9 3) should be specified on the data component unless the cluster has an imbedded index, then TRACKS(8 2) should be specified.

If a VSAM cluster being restored has the original cluster name but the component names are different from the original cluster, specify the same cluster name in both the DSN and NEWNAME operands. This forces FDR to locate the new component names from the catalog.

You are trying to restore a KSDS with the IMBED option (imbedded index) or keyranges and a component has expanded into additional extents, it may not be possible for you to pre-allocate the cluster since the arrangement of the component RBAs will not meet FDR's requirements. However, FDR can allocate the cluster properly, so FDR will issue messages telling you to scratch the cluster and try the restore again.

**Instead of trying to DEFINE the cluster yourself, it is usually easier and faster to let DSF or ABR do the DEFINE. For logical (unlike device) restore or copy/move, you MUST let DSF or ABR define the cluster.**

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## 52.11 CONTINUED . . .

**ICF CATALOG  
RESTORE**

DSF and ABR can dump and restore ICF catalogs. ICF catalogs can be restored without restoring or affecting the clusters cataloged within them. After a restore, an IDCAMS DIAGNOSE should be run against the catalog to detect any inconsistencies between the catalog and the VVDS data sets associated with it. This will detect clusters which are in the catalog but were scratched since the backup. These entries can be deleted using IDCAMS with a DELETE NOSCRATCH Command. A DIAGNOSE of all the VVDS's which reference this catalog will detect clusters which were added since the backup. A DEFINE RECATALOG command will re-establish these clusters in the catalog; information exclusively maintained in the catalog will not be re-established automatically, but must be specified on the DEFINE RECATALOG command.

This is a significant advantage over other methods of restoring these catalogs which require the individual clusters to be restored in order for the catalog to be recreated.

ICF catalogs can be restored to a new volume. FDR will alter the self-defining records within the catalog to reflect the new volume serial. However, ICF catalogs can only be restored to the same disk device type they were dumped from.

ICF catalogs cannot be restored to a NEWNAME. The reason for this restriction is that the clusters cataloged within this catalog, including its own self-defining record, would not know the NEWNAME. If a catalog is re-allocated, VSAM may assign a new name to the index component of the catalog. FDR is designed to recognize this change without the use of NEWNAME.

DSF and ABR will allocate an output ICF catalog if it does not already exist on the target volume, automatically connecting it into the master catalog of the system it is restored on and the VVDS on the volume it resides on. You cannot restore an ICF catalog to a new volume while the original catalog is known to the master catalog, because this would create a duplicate entry in the master catalog. You must either DELETE the original catalog (possibly specifying RECOVERY), or do an EXPORT DISCONNECT. When DSF or ABR DEFINES an ICF catalog, they do not re-establish any ALIASes that may have been associated with it. You must do this with DEFINE ALIAS after the restore.

Because of the above considerations, FDRCOPY cannot copy or move an ICF catalog.

You should not restore a catalog in the same jobstep that restores any data sets that are cataloged in that catalog. For example, if the restore does a DEFINE for a data set, the new catalog entry will be wiped out when the catalog is restored.

**VVDS DUMP  
AND RESTORE**

DSF or ABR can backup the SYS1.VVDS data set. If a restore of this data set is to be done, it should be done with care. This data set is in effect the VTOC for the ICF VSAM files on this volume (and on SMS-managed volumes, for non-VSAM data sets as well). If a VVDS is restored, there exists the potential that the information contained in the VVDS, the VTOC and the catalog will be out of synch. An IDCAMS DIAGNOSE should be run after a VVDS restore, on the VVDS and all the catalogs which use the volume, which will detail most of the inconsistencies between the VVDS, the VTOC and the ICF catalogs. Any errors must be manually corrected.

To ensure that the VVDS is not accidentally restored, DSF and ABR will not restore the VVDS unless the fully qualified name is specified (DSN=) and PROT=NONE is coded on the RESTORE statement. The VVDS should be the only VSAM cluster restored in this execution. If the VVDS is included as part of an ALLDSN or DSG= restore, it will be bypassed with a warning message.

The SYS1.VVDS data set cannot be restored to a newname, and it must be restored to the same tracks that it was dumped from. The reason for these restrictions is the presence of self-defining records within the VVDS and every catalog which references it. So if the VVDS has been deleted or the volume reinitialized, it is not possible for FDR to allocate and restore a usable VVDS (except by full-volume restore). If the VVDS has been lost, you will generally have to recover a backup copy of every VSAM cluster on the volume (non-VSAM data sets as well on a SMS-managed volume).

If the volume serial number is changed on a volume containing a VVDS, all of the VSAM clusters on that volume will be inaccessible. The FDR system will not be able to dump and restore them by cluster name.

FDRCOPY cannot copy or move a VVDS.

**Since FDR updates the VVDS during the allocation and restore or copy/move of an ICF cluster, it is almost always a mistake to explicitly restore the VVDS, except during a full-volume restore. Contact INNOVATION for advice before attempting to restore the VVDS.**

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## 52.11 CONTINUED . . .

**MULTI-VOLUME VSAM CONSIDERATIONS**

Multi-volume VSAM Clusters are VSAM clusters having components which reside on multiple volumes. There are four types of multi-volume clusters:

1. A KSDS with the index component on one volume and the data component on another.
2. A KSDS with an alternate index on a different volume.
3. A key range KSDS with the keyranges on multiple volumes.
4. Any type of cluster where any component, including a single keyrange component, has expanded to multiple volumes.

In addition, there are two types of single-volume VSAM clusters which, because of their special allocation requirements, are treated like multi-volume clusters during allocation:

1. A "split imbedded index" KSDS, that is, a KSDS with the IMBED option, where the index component has gone into additional extents after allocation.
2. Any keyrange KSDS.

Most of the comments in this section do not apply to these clusters, except for the explanation of allocation.

FDR and ABR full-volume operations can always handle multi-volume VSAM clusters, as long as all volumes involved are dumped and restored at the same time, and all volumes are restored to their original volume serial numbers. DSF, FDRCOPY, and ABR data set operations can dump, restore and allocate multi-volume clusters, but there are some special rules and considerations:

The IBM update/last reference date support sets the update indicator and last reference date only for the data component on the first volume for the base cluster. Key range clusters never have those dates set even on the first volume. This presents a problem for ABR in that incremental backups cannot determine if the components residing on the remaining volumes need to be dumped. On incremental backups, ABR will always dump these multi-volume components except for an alternate index residing on a volume by itself.

Likewise, ARCHIVE and SUPERSCRATCH cannot determine the last reference date when processing other than the first volume of the base data component. ARCHIVE may select a cluster from that first volume based on last reference date, but will not select the same cluster from any other volume based on date. Other ARCHIVE criteria, such as DSN, and PROFILE/VALIDATE will select a cluster from all of its volumes. It is possible to select multi-volume clusters by last reference date by using FDREPORT as a pre-processor to ABR; if you need to ARCHIVE VSAM by ADAYS= and multi-volume VSAM might be involved, see the NEWS member in the ICL Library.

If ARCHIVE selects a multi-volume cluster from a volume, all components of the cluster on that volume will be backed up and recorded in the Archive Control File; however, ARCHIVE will not DELETE that cluster until it has been ARCHIVED from all its volumes. It is a requirement that the cluster must be ARCHIVED from all of its volumes in the same ABR ARCHIVE step; otherwise ABR cannot tell when all pieces of the cluster have been processed (SELECT CATDSN= is a way to insure that all volumes are processed by ABR). RECALL is supported for multi-volume clusters; when it is deleted by ABR, it will be recataloged as a multi-volume non-VSAM data set with the ABR RECALL indicators.

SUPERSCRATCH (DUMP TYPE=SCR) will DELETE a multi-volume cluster from all of its volumes if any component meets the selection criteria on any processed volume, except that the last reference date will be checked only on the first volume of the base data component.

If you have backed up a multi-volume cluster and wish to restore it, and the cluster still exists on disk, you can simply restore back on top of it, without deleting it, just like you can for single-volume clusters. However, the cluster must be in essentially the same state it was in when backed up; it must not have expanded to new extents, and must not have been deleted and redefined. FDR will simply overlay the extents of the cluster, and update the VVDS information appropriately. You must be sure that each piece of the cluster is restored back to the volume it was dumped from; this is automatic with ABR and under user control with DSF. Rules for restoring multi-volume clusters are explained later in this section.

If the cluster has been deleted from disk (or you are restoring or copying to a new name), it is usually not possible for you to pre-allocate multi-volume VSAM components in a way which is acceptable to FDR. It is much easier to let FDR allocate the multi-volume cluster.

For program FDRABRUT (Remote Queue) to support multi-volume VSAM clusters for the BACKUP or ARCHIVE commands, the DISKUPDATE=NO option must be enabled, causing the remote queue data set to be used.

If a VSAM multi-volume cluster is to be marked for special processing, using program FDRABRM, each of the component names must be specified individually.

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## 52.11 CONTINUED . . .

**ALLOCATING  
MULTI-  
VOLUME  
VSAM**

In most cases of multi-volume clusters, including those with multi-volume components, FDR can allocate and catalog the cluster if it does not exist on the output disk, with these special considerations:

- \* a restore or copy/move is still a volume-by-volume operation. FDR will process one backup data set or one input disk at a time, and will attempt to allocate and restore only the components or parts of components on that backup or disk. However, FDR recognizes that the cluster is multi-volume and uses a unique technique for allocating those components. If the multi-volume cluster must be allocated by FDR, the volumes must be done one at a time; you can process all of the volumes in one job or jobstep, but you cannot run multiple restore jobs to restore in parallel. It does not matter what order the volumes of a multi-volume cluster are processed in.
- \* As it proceeds, the components on each output disk will be accurately allocated and restored as VSAM. However, until the final volume of the cluster is restored, the cluster will be cataloged as non-VSAM, with special indicators in the catalog entry. Once that last volume is processed the cluster will be recataloged properly as VSAM. So, the cluster will not be usable in any way until all pieces are successfully restored.
- \* If you display the catalog entry of a multi-volume cluster before FDR completes that last volume (e.g., with LISTCAT), it will appear as non-VSAM. The first volume serial will be #####Vx where "x" indicates the type of cluster; the other volsers will be the volumes where FDR has complete the restore. If you see this type of catalog entry, it is not abnormal, but simply means that there are more pieces of this cluster which must be restored or copied before it is usable. Another indication of multi-volume allocation status is the FDR311 message printed when FDR restores data sets; for a multi-volume VSAM cluster, that message will say ALLOCATED but not CATALOGED until the last volume of the cluster is processed (if multiple components exist on that last volume, only the last component says CATALOGED). Once CATALOGED appears, the cluster is usable.
- \* When allocating a cluster with multi-volume components, FDR must be able to allocate those components on the same number of volumes they originally occupied. If an output volume cannot be selected which does not already contain a part of the component, the operation will fail (but it can be rerun if another output volume can be provided). The rules for selection of output volumes depend on which program you are executing (FDRDSF, FDRCOPY, or FDRABR) and are detailed in [Section 20.07](#), [21.01](#) and [50.08](#), [51.06](#) respectively. Providing a sufficient choice of volumes may be a matter of restoring to the original volumes, providing proper DD statements, providing an NVOL= operand, or setting up the ABR RESTORE ALLOCATION LIST to define volume pools. If the rules provide a choice of volumes, the allocation of a component or partial component may be tried on a number of volumes until one is found where it is successful.
- \* FDR cannot allocate an alternate index (AIX) which is itself on multiple volumes. However, the base cluster will be restored and the alternate index can be redefined and rebuilt with an IDCAMS BLDINDEX if necessary. Even a single-volume AIX cannot be allocated unless the base cluster has been previously restored or DEFINEd, or unless the backup of the volume containing the AIX also contains the LAST piece of the base cluster to be restored.
- \* If a component of a multi-volume cluster being allocated was originally in multiple extents, it will be allocated with the same number and size extents on the output volume.
- \* If the restore of a multi-volume cluster cannot be completed (due to insufficient volumes, lack of space, or other errors) the pieces which were restored will be left on their volumes and the special non-VSAM catalog entry will be left. To delete those entries, you will have to use IDCAMS to

```
DELETE cl ustername NOSCRATCH
```

to delete the non-VSAM catalog entry, and

```
DELETE componentname VVR FILE(DD1) CAT(catal ogname)
```

on each component on each volume to delete them (see the IBM Access Method Services manual for details).

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## 52.11 CONTINUED . . .

### RESTORING MULTI- VOLUME VSAM

To restore a multi-volume VSAM cluster with FDRDSF, supply a TAPEX DD statement for the backup of each volume on which the data set resided, and code one SELECT statement specifying the cluster name. Output volumes can be specified by DISKx DD statements, by NVOL= parameters; if neither is specified DSF will restore back to the original volumes or if the cluster currently exists on disk, to the volumes in the catalog.

Multi-volume clusters can be copied, but not moved, with FDRCOPY. Since FDRCOPY processes one input volume at a time, and the original cluster still exists, the special allocation techniques just described will not work unless a new name is given. So COPY requires a new name, which should be specified using the NEWGROUP= or NEWINDEX= operands (not NEWNAME=). If necessary, when the copy is complete, the original cluster can be deleted and the new cluster (and all of its components) can be renamed with an IDCAMS ALTER; however, it is probably easier to dump and restore the cluster with FDRDSF. This is an example of copying a 2-volume cluster, using CATDSN= to select the input disk volumes and using NVOL= to specify the output:

```
//COPY          EXEC   PGM=FDRCOPY, REGI ON=2M
//SYSPRI NT     DD     SYSOUT=*
      COPY TYPE=DSF
      S CATDSN=MULTI . VOLUME. CLUSTER, NEWI =. +NEW, NVOL=(TEST01, TEST02)
```

For both FDRDSF and FDRCOPY, the volumes of the multi-volume cluster can be processed in one step or in multiple steps, and in any order. But the cluster will not be usable until all volumes have been processed.

For restore from ABR backup, simply provide one SELECT statement specifying the base cluster name, e.g.,

```
      SELECT DSN=cl uster
```

If the cluster still exists on disk, ABR will locate all volumes it exists on, and restore the contents of each component on all volumes. If the cluster has been scratched and you have implemented the ABR DADSM pre-processing exit ([See Section 92.60](#)) so that the cluster is recorded in the ABR scratch catalog, it will be allocated and restored on its original volumes or on alternate volumes specified by NVOL= or the ABR RESTORE ALLOCATION LIST. If the cluster has been scratched and is NOT in the scratch catalog, you will need to specify one SELECT for each volume, giving the cluster name, volume and generation/cycle of the backup, e.g.

```
      SELECT DSN=cl uster, VOL=vol ume, GEN=gggg, CYCLE=cc
```

For restore from ABR ARCHIVE or from application backup (SCRATCH=NO), provide one SELECT specifying the base cluster name and ABR will restore all the components of the cluster from all volumes (assuming that they were dumped from all volumes the cluster existed on); the output volumes will be selected by the same rules as restore from backup.

**Multi-volume clusters cannot be restored or copied/moved to an unlike device type, e.g, 3380 clusters can only be output to 3380s. IDCAMS or other utilities must be used if you must move multi-volume clusters to new device types.**

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**52.12 HOW ABR INTERFACES WITH TAPE MANAGEMENT SYSTEMS****TAPE  
MANAGE-  
MENT  
SYSTEMS**

ABR has no explicit interfaces to tape management systems, so ABR cannot directly control the retention and expiration of ABR-created tapes. However, ABR can indirectly influence the actions of tape management systems on ABR tapes by the retention periods or expiration dates passed to the tape management systems when the tape files are originally opened by ABR, and by uncataloging tapes. This section describes the options that are available.

The tape management systems used most widely by ABR customers are CA-1 (formerly known as UCC-ONE and TMS) and CA-TLMS, both available from Computer Associates. ABR can be used successfully with these systems, with other tape management systems, or with no tape management software at all.

**TMS OPTION**

If you have a tape management system, you must let ABR know by activating the TMS option in the FDR/ABR global option table. This is done with program FDRZAPOP ([Section 91](#)) or by the ABR ISPF installation dialogs ([Section 92](#)). The TMS option has absolutely no effect unless you have ABR; ABR needs to know if there is tape management in the operating system.

**RETENTION  
TECHNIQUES**

There are two techniques generally used by tape management systems for ABR tapes. The first is “date control”, where an explicit expiration date is assigned to the tape data set. The other is “catalog control”, where the data set is retained as long as it is still in a system catalog.

Some other retention techniques supported by tape management may work with ABR, but another common tape management technique, “cycle control”, will not work for ABR tapes. Cycle control only works for data sets which have the same name; ABR tapes are usually assigned unique data set names.

Controlling which retention technique will be used for ABR tapes varies by tape management system:

- CA-1 will use date control automatically unless certain keyword LABEL=EXPDT= values are specified requesting special retention. However, the CA-1 Retention Data Set (RDS) can override and ignore the retention specified at run time.
- the CA-TLMS Retention Master File (RMF) specifies the retention technique to be used for all tape data sets; a default retention type is used for all data sets not specifically named. Retention values set by ABR or by JCL keywords will be ignored UNLESS the proper retention type is indicated in the RMF.

For these and other tape management systems, consult the vendor documentation for more information on tape retention.

**DATE  
CONTROL**

When ABR creates a tape data set, an expiration date is set. This may be an explicit date, or it may be calculated from a retention period (current date plus the retention days). ABR may set this date itself, or it may be set from a user-provided RETPD= parameter on the DUMP statement, or specified by LABEL=RETPD=nnnn or LABEL=EXPDT=yyddd on the TAPE DD statement. The details are in [Section 52.06](#).

The resulting expiration date is stored by ABR into the JFCB (Job File Control Block) used during OPEN of the tape; OPEN will write it in the header label of the tape, and it is also recorded by the tape management system. The tape management system will not allow that tape file to be overwritten until the expiration date is reached, and will place the tape on a scratch list when it expires. Tape management utilities can be used to modify the saved expiration date, if required.

Date control can also be used on systems with no tape management software, since the operating system will not allow a tape file which has not reached its expiration to be overwritten unless the system operator replies to a console message.

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## 52.12 CONTINUED . . .

**CATALOG  
CONTROL**

Catalog control will retain an ABR tape data set as long as the data set is still in a system catalog; the rules for cataloging ABR tapes are explained below. A tape management utility job, usually run nightly, will check the catalog status of every tape data set marked for catalog control, and will expire any which are not cataloged.

For CA-1, catalog control is specified by LABEL=EXPDT=99000 on the TAPE DD statement, or in the RDS. For CA-TLMS, catalog control is indicated by retention type "1" in the RMF.

**CATALOGING  
OF ABR  
BACKUP  
TAPES**

In the BACKUP subsystem, ABR catalogs every tape data set it creates. (ABR creates one backup file for each disk volume that is processed in each run, except for DUMP TYPE=DSF for volumes which have no data sets selected). The ABR catalog is a normal ICF catalog or OS CVOL, so it meets the requirements for tape management catalog control.

ABR uncatalogs backup tapes a generation at a time. Each disk volume under ABR management has associated with it a number of generations to keep, given when the volume was initialized for ABR, or modified later, by the FDRABRM utility ([Section 55 and 90](#)) or by the ABR ISPF installation dialog ([Section 92](#)). Whenever ABR takes a full-volume backup of any disk, starting a new generation, it uncatalogs one older generation. That generation number is calculated as the current generation number minus the number of generations to keep. In that generation, all cycles will be uncataloged.

So, catalog control is appropriate for ABR backups; the generation that ABR uncatalogs will automatically expire. Date control can also be used for backups; in that case, be sure to initialize the disk volumes with a large enough value for generations to be kept so that ABR will not uncatalog them before the tape management system expires them.

**CATALOGING  
OF ABR  
ARCHIVE  
TAPES**

In the ARCHIVING subsystem, when ARCHIVING to tape, ABR only catalogs the first file created on each TAPE DD statement, plus any file that crosses reels. All information concerning archive files that ABR requires is recorded in the ARCHIVE Control File; the ABR catalog entries for archive tapes are not used again by ABR. However, ABR catalogs archive tapes in case the user chooses to control their retention through catalog control; the catalog entries may also be used when copying archive tapes with the FDRTCOPY utility ([Section 10](#)).

ABR uncatalogs archive tapes when the user reorganizes the Archive Control File (FDRARCH program, REORG Command, [Section 55.14](#)). If all of the disk data sets that were archived to a given archive backup file are purged, as specified by the DELETE=, EXPIRE=, and RESTORE= operands of the REORG command, and that archive backup file was cataloged, then FDRARCH uncatalogs it. However, if there are any other archive backup files on the same reel of tape from which not all of the archived data sets have been purged, then FDRARCH catalogs one of the remaining archive files, in order that the tape will not be set to scratch if you are using catalog control.

With the TMS option enabled, FDRARCH REORG will only uncatalog tapes if the recorded expiration in the Archive Control File is "99000" (catalog control). Since the true desired expiration of the tape is not known, FDRARCH cannot purge entries based on expiration, and will only purge them if they are flagged as being restored (RESTORE=PURGE) or manually flagged for deletion by the FDRARCH DELETE command (DELETE=PURGE). Because of this, catalog control is usually not appropriate for archive tapes. Custom zaps are available from INNOVATION to cause ABR to catalog ALL archive tape files it creates, and to make REORG uncatalog all unreferenced tapes regardless of expiration date. Since archive tapes may be retained for years (as opposed to backups which are usually retained for a month or two), this may create a large number of entries in the ABR catalog.

Tapes created by the ARCHIVE subsystem with the SCRATCH=NO operand (See "Application Backup" in [Section 52.08](#)) will NEVER be cataloged. Catalog control should not be used for those tapes unless another file created by the user on the same tape is cataloged (such as the backup of the ARCHIVE Control File).

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**UNCATALOG-  
ING BY TAPE  
MANAGE-  
MENT  
SYSTEMS**

Tape Management Systems, when operating by date control, may uncatalog tape data sets when the tapes expire (this may be an option, consult their documentation). As explained above, ABR also includes code to uncatalog all backup and archive tapes when they expire. Whichever system attempts first to uncatalog a given tape data set will succeed, and the other system will fail. Neither system will consider this to be a problem.

**SYNCHRONI-  
ZATION OF  
EXPIRATION**

In the BACKUP subsystem, ABR considers a tape to be unavailable when it is uncataloged from the ABR catalog, regardless of who uncataloged it. If you are using date control, ABR may uncatalog a tape before it reaches the tape management expiration date (See "Cataloging of ABR backup tapes" above); in that case, you can no longer do automatic restores from that backup, but can still manually restore using the TAPEDD= operand, providing a TAPEX DD statement pointing to the unexpired tape data set. It can also happen that tape management may expire a tape but not uncatalog it from the ABR catalog; if a restore is requested from such a tape, it will get a Sx13 OPEN abend if the tape has been overwritten with other data. Neither of these should occur with catalog control. ABR does not record the expiration dates of individual backup data sets.

In the ARCHIVE subsystem, ABR records the expiration of every archive file created in the ARCHIVE Control File. The ARCHIVE Control File contains an entry for every original disk data set which was archived, with pointers to the archive files containing that data set (COPY1 and optionally COPY2). A separate expiration date is recorded for each copy, so each copy can expire on a different date. This expiration is normally the same as that recorded by the tape management system, but if the tape management expiration was overridden by specifications in the RMF or RDS, or if it was changed by a tape management utility, then ABR may purge the ARCHIVE Control File entries early, or may try to restore from an expired tape, resulting in a Sx13 OPEN abend. To avoid this, the retention or expiration specified in the ABR run should match that specified in the RMF or RDS; if expirations are changed in the tape management system, then they should also be changed in the ARCHIVE Control File by the MODIFY command of FDRARCH (See Section 53).

**MULTI-FILE  
TAPES**

ABR usually puts more than one file onto each tape volume. In the ARCHIVE subsystem, these files will all have the same expiration date, but in the BACKUP subsystem, if the default retentions associated with each disk volume are used, the tape files may have varying expirations.

The LASTAPE feature of ABR provides a method of improving tape utilization by allowing you to add tape files onto tapes that were created in a previous ABR step or job. LASTAPE is most useful if each ABR run uses a relatively small amount of tape, so it is most often used for ARCHIVING. If you do not use LASTAPE, then each run of ABR will call for fresh scratch tapes. You request the LASTAPE feature by coding a DSNAMES starting with 'FDRABR.LASTAPE.xxxx' on the TAPE DD Statement, where xxxx is any set of characters that you choose. If DISP=(MOD,KEEP) is also specified, this tells ABR to call for the same tape reel that was used last in the previous ABR execution that used the same xxxx characters. In the current execution, ABR will start writing at the point where the previous execution left off. In this way, no tape will be wasted at the end of a reel. However, LASTAPE is likely to create tape files with varying expirations.

CA-1 will handle multi-expiration tapes automatically; it will not expire any tape until all files on that tape have reached their expirations (including catalog control).

CA-TLMS normally bases expiration of a tape on the CDS (Controlling Data Set), which is normally the first data set on the tape. For an ABR tape, this may have the lowest expiration on the tape, so the tape may expire long before data sets near the end of the tape reach their expiration. The ABR Installation Control Library (ICL) member TLMSXTRS contains instructions and code for a modification to the TLMS user exit TLMSXTRS, which will prevent ABR tapes from expiring until every file on the tape has expired. All TLMS users running ABR should review this.

**WARNING:** Both CA-1 and CA-TLMS require additional records in their master files to record tape data sets which are not the first data set on a tape (DSNBs in the TMC for CA-1, auxiliary records in the VMF for CA-TLMS). Since ABR is a major user of such data sets, some installations may need to increase the size of the master files or the number of such records when implementing ABR.

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**MULTI-VOLUME  
MULTI-FILE  
AGGREGATES**

ABR may also create multi-volume multi-file aggregates on tape. An ABR aggregate may have up to 255 files and may occupy an indefinite number of tape volumes. Both CA-1 and CA-TLMS handle such aggregates automatically. All of the tapes in an aggregate will be retained or expired as a unit, all at once.

If the LASTAPE option was used, and files were created on a multi-volume aggregate with ascending expirations, there is no facility in those tape management systems to expire tapes from the beginning of an aggregate, even if all of the files on the early tapes have expired. For this reason, it is usually a good idea to limit the number of times that you add files to an aggregate with LASTAPE. If you specify DISP=(NEW,KEEP) on the TAPE DD with the LASTAPE dsname, or if you manually uncatalog the FDRABR.LASTAPE.xxxx dsname, ABR will call for a fresh scratch tape. The MAXFILES= operand on the DUMP statement can also limit the number of files that ABR will create on an aggregate.

**VARYING  
EXPIRATIONS**

Many installations wish to create monthly, quarterly, or yearly backups which are to be kept for a longer period than the normal ABR backup or to keep the full-volume backups for a longer period than their associated incremental backups. With a tape management system this is easy.

Each disk volume should be initialized to retain a number of ABR generations equivalent to the longest backup you plan to keep; this prevents ABR from uncataloging any backup which is still available for restores. For example, if you create weekly full-volume backups, and you plan to keep certain backups for one year, set each volume to keep 52 or 53 generations.

Specify the proper retention on each ABR backup job. To expire daily incrementals early, specify the proper RETPD=nn in the daily job, either on the DUMP statement or the TAPE DD statement (we recommend a minimum retention of 14 days or two generations). Your normal full-volume backup job can specify the usual retention (e.g., 35 days for monthly retention), but special full-volume backup jobs can replace the normal job when you want to create long-term retention backups, specifying the proper RETPD= value. Alternately, you can use a tape management utility to extend the retention of certain backups. ABR will not care when they expire as long as they are still cataloged; the tape management system will uncatalog backups which reach their expiration.

ABR can restore data sets from any backup which is still in the ABR catalog. However, the OLDBACKUP option of ABR will only track the most recently created backups of a data set (up to 14), even if they have expired, so recovery from older backup tapes may require reviewing the ABR dump listings, or FDRABRM PRINT BACKUP reports ([See Section 53](#)) to find the required backup of a specific data set, and specifying the VOL=, GEN=, and CYCLE= options on the SELECT statement or on the ABR ISPF panels.

**VAULTING**

How do you tell the Tape Management System to select ABR backup tapes for offsite vaulting? Since the architecture of ABR requires a certain format for its data sets names, you must work with those names, which are described in [Section 52.05](#).

For CA-1, vaulting specification are in the input to a special vaulting utility, and you can specify  
DSN=FDRABR. Vvvvvvv. C2, I NDEX . . .

For CA-TLMS, vaulting specifications are part of the normal Retention Master File (RMF) parameters, where you can specify the DSNAME as:

FDRABR. Vvvvvvv. C2/

where the trailing slash indicates a partially qualified name.

Both tell the vaulting system to vault COPY 2 of all of the ABR backups of the disk pack specified by vvvvvv, plus any other packs that were backed up to the same TAPE DD. Since you can't be sure which disk volumes will be backed up on a particular tape aggregate, or in what order, you should supply one of these vaulting commands for each volume that gets processed by ABR. The last level could be "B2" to vault archive tapes.

For CA-1 only, in the ABR Installation Control Library (ICL), member TMSMASK contains a user-submitted source modification to the CA-1 vaulting program which allows it to accept a "masking" character (%) which will always match, so that "V% % % % %" will match on all disk volumes, and only one DSN= statement is required.

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**ONLY FULL-  
VOLUME  
BACKUPS  
OFFSITE**

Many installations decide not to devote the resources that it takes to keep offsite copies of all ABR backups. They may decide that if a disaster happens, it will be acceptable to recover to the status as of the beginning of the current week. A simple way to set this up is to make duplicate copies of only the full-volume backups, and not the incremental backups, so the vaulting controls shown above will select only the full-volume backups. Since CA-1 allows selection based on creating jobname (jobname qualification), another option is to run the full-volume backups under a different jobname than the incrementals (CA-TLMS also allows jobname qualification, but not with “partially” qualified data set names).

**COPY1=  
COPY2**

An installation may want to create just one copy of all of the backups, both incremental and full-volume, but send offsite only the full-volume backups. To do this, they can specify the operand COPY1=COPY2 ([Section 50.05](#)) on the DUMP Command for only the full-volume backups:

```
DUMP TYPE=FDR, COPY1=COPY2 . . .
```

COPY1=COPY2 tells ABR that even though the run is creating only one copy, the backup data set names should be in the form FDRABR.Vvvvvvv.C2... instead of FDRABR.Vvvvvvv.C1.... The control statements for the vaulting system would still be in the same format as shown above. The vaulting system would still vault all COPY 2 tapes created by ABR backups, but these tapes would only include the full-volume backups (and there would not be any COPY 1 for these backups).

**52.13 TAKING BACKUPS OF SOLID STATE DISKS**

Several vendors offer solid state devices that look like a disk to the CPU. These non-mechanical devices consist of storage (like CPU memory or control unit cache) with a control unit which mimics the operation of some real IBM disk, but without any delays for seek or rotational positioning. In most cases, the device emulates an IBM 3380 or 3390 but may have a number of cylinders different from any real disk (usually less), and with no alternate tracks. FDR, DSF, CPK, SAR and ABR can be used to backup and restore solid state disks, but there are some considerations, and those considerations vary from one vendor to another.

There are several different ways that vendors use to account for the fact that the solid state disk contains a different number of cylinders than a real disk:

- The VTOC of the solid state disk may be initialized to indicate that the disk contains only the number of cylinders that it emulates. This might be done with a vendor-supplied program or with ICKDSF using the MIMIC(MINI(nn)) parameter (which is supported only by stand-alone ICKDSF).
- The VTOC may indicate the normal number of cylinders for a larger IBM disk, but a “place-holder” data set is allocated to occupy the cylinders which don't exist. This place-holder may be allocated by a vendor-supplied program, or you can do it yourself with JCL such as:

```
SPACE=( ABSTR, ( nnnnnn, mmmm ) ) , DCB=DSORG=PS
```

where “nnnnn” is the total number of tracks in the non-existent cylinders and “mmmm” is the relative track number of the first track of the first non-existent cylinder. This JCL will allocate a PS data set with a zero last block pointer.

- A variation of the “place-holder” is a place-holder data set which is allocated to begin on the last usable track of the solid state disk, so that its first track is on a real usable track, and the rest of its space allocates the non-existent cylinders. This JCL will allocate a PDS with one used track starting on relative track “mmmm” (the last usable track):

```
SPACE=( ABSTR, ( nnnnnn, mmmm, 1 ) )
```

However, the rest of the last cylinder may be wasted if all other data sets on the solid state disk are allocated in cylinders.

In any case, the result is that data sets can only be allocated on the cylinders which the device does emulate.

FDR, SAR and ABR full-volume operations will, of course, only dump or restore the tracks occupied by allocated data sets. DSF and ABR data set operations only access the tracks occupied by the selected data sets. In either case, DATA=USED (the default on data set operations) only accesses used tracks in PS/PO data sets; LBPZERO=VALID may be required as well.

In the first case, where the VTOC only shows the emulated cylinders, there are no special considerations for FDR, DSF, SAR or ABR, since no data sets will ever be allocated on a cylinder which is not fully emulated (see note on BUFNO=MAX below). Also, CPK may be used to COMPAKT such disks: CPK will honor the number of cylinders in the VTOC.

In the second case, full-volume operations, and possibly data set operations, will try to access the “place-holder” data set, even though that data set is allocated on non-existent cylinders. FDR129 or FDR123 messages may result indicating I/O errors (usually “command reject”, sense=8000) on those cylinders. These errors can be minimized by specifying DATA=USED and LBPZERO=VALID on full-volume operations, so that FDR and ABR will only try to read the first track of that place-holder. On data set operations, no error will occur if the place-holder is excluded from the dump/restore. If I/O errors do occur, the operation will end with a U0888 abend (return code 12 for ABR) to call attention to the error; there is no easy way to suppress that error, but the dump/restore will complete and all other allocated tracks will be processed successfully.

However, an attempt to COMPAKT such a disk will fail because of the I/O errors during the DUMP.

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## 52.13 CONTINUED . . .

At least one vendor allows the first track of the “place-holder” to be “read” (actually a track containing only an end-of-file is simulated) which will allow a dump with DATA=USED and LBPZERO=VALID to run without error. COMPAKTOR may be used on such disks, as long as the place-holder data is made unmovable ([See Section 40.24](#)).

The third case, where the “place-holder” begins on a usable track, FDR, DSF, SAR, CPK and ABR should be able to run normally (as long as DATA=USED and LBPZERO=VALID is in effect).

Note on BUFNO=MAX: Since solid state disks do not need alternate tracks, they do not emulate them; any attempt to read or write the tracks which would be alternates on a real disk usually result in I/O errors (command reject). FDR/DSF/ABR only attempt to access the alternate tracks directly during a dump operation, and only if the performance option BUFNO=MAX is NOT used. Errors reading the alternate tracks result in message FDR121 REASON=1, which can be ignored. Since BUFNO=MAX is now the default for all dumps, FDR121 messages will occur only when BUFNO=MAX is not supported (such as dump to a backup data set on disk).

Consult with your solid state disk vendor or their literature to see which technique they recommend for initializing the disk, and what special programs they provide to support it.



**52.14 DATA MOVEMENT BETWEEN DIFFERENT DASD DEVICES**

The FDR/ABR system can be used to move or restore data from one disk device type to another. This section describes some of the techniques and rules for doing so.

A disk device is characterized by the maximum number of bytes that can be written on a track, and by the number of tracks in a cylinder; these are called its "device geometry". FDR considers two disks to be "unlike" devices if either of those two values is different. For example, a 3380 and a 3390 disk have the same tracks/cylinder (15) but the bytes/track is different (47476 vs 56664) so FDR treats them as unlike devices.

However, within a type of disk, such as 3380 or 3390, there are different models which have a different total number of cylinders. For example, 3380s have single density models (with 885 cylinders), double density (3380-Es with 1770 cylinders), and triple density (3380-K with 2665 cylinders). 3390 disks operating in 3380 compatibility mode look like 3380s but have still different cylinder capacities. 3390s in native or compatibility mode also have 1113 (3390-1), 2226 (3390-2) or 3339 (3390-3) cylinders.

**FULL-VOLUME  
RESTORE**

A FDR or ABR full-volume restore (RESTORE TYPE=FDR) can be used only to restore to different density disks within the same device type. Since full-volume restore rewrites the exact images of the original tracks, it cannot restore to a "unlike" device since the data would not be formatted properly for the different device geometry.

Restores to a volume with a **larger** number of cylinders than the original disk are fully supported by FDR and ABR. Since all of the tracks being restored exist on the output disk, they can all be restored properly. All that is required is to make the new tracks available for allocation of new data sets as free space.

Restores to a volume with a **smaller** number of cylinders can also be done, as long as the original volume has no data sets allocated on cylinders which do not exist on the output disk. To enable this restore, specify the PROT=NONE operand on the RESTORE or COPY TYPE=FDR statement. Tracks which no longer exist must be removed from the free space on the volume. However, COMPAKTOR is a preferable method for doing this conversion, as described later in this section.

To update the free space, at the end of the restore, FDR/ABR will set DOS flag in the Format 4 DSCB in the VTOC, telling the operating system that the Format 5 (free space) DSCBs are invalid and must be rebuilt. Then a dummy data set will be allocated causing this to occur. The dummy data set's name is

```
FDRABR. VvvvvvvvZ
```

where "vvvvv" is the disk volser. However, the requested space is so large that the allocation will fail, this is expected. **Your security system, if any, must allow the allocation of this data set for the free space update to occur.**

If the original volume had an active indexed VTOC, it will be disabled after the restore and must be rebuilt by the user ([See example in Section 10.08](#)).

After a full-volume restore, all data sets, including the VTOC, indexed VTOC, and VVDS will have the same size and position as they had on the original disk.

Full-volume restore to a different density disk only supports output disks whose size is in an FDR table. This includes all standard IBM disks and EMC symmetrix disks. Use COMPAKTOR for disks with a non-standard number of cylinders.

**FULL-VOLUME  
COPY**

A FDR full-volume disk-to-disk copy (COPY TYPE=FDR) can also copy between different densities of the same disk type. The rules are the same as for a full-volume restore.

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## 52.14 CONTINUED . . .

**COMPAKTOR** Since a COMPAKTion is essentially a full-volume, track-image restore, COMPAKTOR is also limited to restoring to models of the same disk type.

A COMPAKTOR restore to a different density disk has several advantages over a full-volume restore:

- Since COMPAKTOR can move data sets, when restoring to a smaller disk, it will automatically move data sets to fit in the new space, even if they were allocated beyond the limits of the new disk, unless they are unmovable or there is insufficient space to hold all of the data.
- If there is insufficient space, the SELECT statement operand SCRATCH=YES can be used to eliminate non-VSAM data sets until the remaining data sets do fit (for non-SMS-managed volumes only).
- COMPAKTOR can move the VTOC to an appropriate location on the output disk. It can also expand the VTOC, which may be required on a larger disk since more data sets may be allocated there.
- COMPAKTOR can move (but not expand) the indexed VTOC and VVDS.
- COMPAKTOR will automatically rebuild the Format 5 DSCBs indicating the proper free space for the size of the output disk.
- If the volume had an active indexed VTOC, COMPAKTOR will automatically rebuild it.
- COMPAKTOR supports output disks with a non-standard number of cylinders, by honoring the cylinder count in the VTOC.

**DATA SET RESTORE** A DSF or ABR data set restore can be done to the same device type as the original data set, or, in most cases, to an “unlike” disk device.

When restoring to a “like” disk device, all densities and models of the disk are treated the same, since the disk geometry is the same. A “physical” track-image restore is done. If the output data set must be allocated, there must be sufficient free space on the volume to contain the data set, so, for example, a data set which occupied an entire 3380-K cannot be restored to a smaller 3380. DSF/ABR data set operations have no facility for “breaking apart” a single data set onto multiple volumes. Likewise, a data set which was in multiple parts on several original disks cannot be combined into one piece on a larger disk, it must be restored to as many disks as it was dumped from. Data sets which were marked as “unmovable” and were allocated in the upper parts of a larger disk cannot be allocated on a smaller disk, since those tracks are not available. Details on how physical device restore handles various data set types is in [Section 52.15](#).

When restoring a data set to an “unlike” disk, since the device geometries differ, a “logical” restore will be done. Although the original backup is still in track-image format (FDR has no need to do a special logical backup), the data will be extracted and reformatted for the new device type. The amount of space required for each data set will be adjusted so that the output data set occupies about as many bytes as the data set did on its original disk. Details on logical restore of various data set types are also in [Section 52.15](#).

A logical restore may also be done if data set reblocking is requested, or for data set types requiring special processing.

When restoring to a new disk volume serial, DSF and ABR can recatalog the data set to the new disk, if the RECAT (for non-VSAM data sets) and VRECAT (for ICF VSAM clusters) operands were specified. **VRECAT will delete the original cluster if it still exists.**

**DATA SET COPY/MOVE** FDRCOPY can copy or move data sets to “like” and “unlike” devices, under the same rules as for data set restore (FDRCOPY is essentially a track-image dump and a physical or logical restore in the same step). Although FDRCOPY is a very fast way of moving data sets to a new disk, and can run without operator intervention (tape mounts), no backup is created by FDRCOPY.

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## 52.14 CONTINUED . . .

**CONVERTING  
TO LARGER  
DISKS**

Often, to gain more disk capacity in the same floor space, disks of one capacity are replaced with “like” disks of a larger capacity (such as converting 3380 single density disks with triple density 3380-Ks). Usually, the lower density disks must be combined onto a smaller number hi-density disks.

If possible, one of the original disks can be directly converted to a hi-density disk under its original volume serial. This can be done with an FDR or ABR full-volume restore, or COMPAKTOR. Since data sets restored by a full-volume operation are NOT recataloged, this restore MUST be done using the original volume serial (CPYVOLID=YES). COMPAKTOR is preferable for this operation since it can expand and relocate the VTOC. Examples of full-volume conversion can be found in [Sections 10.08, 10.09, and 40.14](#). Data sets from other original volumes can be added to the hi-density disk with DSF or FDRCOPY as described below.

If the full-volume operation is not possible (if, for example, the new disks must have new volume serials), then ALL of the original data sets must be moved with DSF or FDRCOPY.

To move data sets to the hi-density disk:

- FDRCOPY can easily move all data sets on a volume to a new volume. This is the recommended method. Examples can be found in [Section 21.07](#).
- DSF can restore all data sets from an FDR full-volume backup or DSF backup of the original disk volumes. RECAT and VRECAT should be specified so that all data sets are cataloged on the new volume. [Section 20.11](#) contains an example.

**CONVERTING  
TO SMALLER  
DISKS**

It may be necessary to fall-back or convert from hi-density disks to lower-density disks of the same type (such as from triple density 3380-Ks to single density 3380s).

If the data sets on the larger disk will all fit on the smaller disk, then a full-volume restore or COMPAKTion may be used to do the conversion, as described earlier in this section.

In most cases the data will not fit on a single output disk, and must be spread over multiple output disks. The DSF and FDRCOPY techniques just described for converting to hi-density disks can also be used for conversion to lower-density disks. The NVOL= operand on SELECT statements for DSF, ABR, or FDRCOPY must specify multiple disk volumes, e.g.,

```
NVOL=( PRODO1, PRODO2, PRODO3)
```

or

```
NVOL=PROD*
```

which will spread the selected data sets over the indicated volumes. Examples can be found in [Sections 20.11 and 21.07](#).

**CONVERTING  
TO NEW DISK  
TYPES**

Since full-volume operations do not work with “unlike” disk devices, only data set operations can be used to convert data sets to a new disk device type (such as 3380 to 3390). The DSF and FDRCOPY techniques just described for conversion between models of “like” disks can be used for “unlike” conversion.

However, there are special considerations and restrictions on certain data set types; the details are in [Section 52.15](#).

**52.15 PROCESSING CONSIDERATIONS BY TYPE OF DATA SET**

This section describes how FDR data set operations (including DSF dump and restore, ABR dump and restore, and FDRCOPY copy and move) handle specific types of data sets.

Since FDRCOPY is essentially a data set dump and restore in the same task, all comments on dump apply to the input side of FDRCOPY and all comments on restore apply to the output side, unless there are specific notes about FDRCOPY.

As described in [Section 52.14](#), a “physical” restore is used when restoring a data set unmodified to the same type of disk it was dumped from; tracks are restored exactly as they were on the input disk, except that they may be at new locations on the disk. A “logical” restore is used when restoring to an unlike disk type, or when reblocking of the data set is requested; the data set will be rearranged for the new disk geometry.

Member UNLIKE in the FDR Installation Control Library (ICL) contains the latest information on logical restores; you should review it before moving data to unlike disk.

All dumps are “physical” so that images of the input data set’s tracks are written to the backup. The DSCBs and VVDS records for all data sets dumped are written to the beginning of the backup data set for restore use. An FDR or ABR full-volume backup treats individual data sets the same as a data set backup, except that the default of DATA=ALL instead of DATA=USED is used.

**SEQUENTIAL  
(PS)**

**DUMP:** Only the used space in a PS data set (up to the “last block pointer” in the Format 1 DSCB) is dumped, unless the option DATA=ALL is in effect. If the last block pointer is all zeros (which could mean that the data set contains no records, or that it was never opened for output, or that it was updated by an access method that does not maintain the LBP), the entire allocated space will be dumped unless the option LBPZERO=VALID is specified or defaulted in the FDR/ABR global option table ([See Sections 91 or 92](#)) when only one track will be dumped.

LBPZERO=VALID is recommended unless you know that you have data sets with invalid last block pointers.

**RESTORE:** Normally the used tracks of a PS data set will be restored (up to the last block pointer); the dump rules about DATA=ALL and LBPZERO=VALID apply (a DATA=ALL restore can only be done from a dump done with DATA=ALL). A physical restore will restore each track image for each selected track. A logical restore will rearrange and/or reblock the data set and will restore data until a EOF (End-Of-File) record is encountered.

If reblocking is requested (BLKF= operand), and the data set has RECFM=FB or VB the logical records will be reblocked to the new physical blocksize, which must be larger than the original blocksize (except when restoring to a disk with a smaller track size than the original disk).

**PARTITIONED  
(PO-PDS)**

**DUMP:** Only the used space in a PO data set (up to the “last block pointer” in the Format 1 DSCB) is dumped, unless the option DATA=ALL is in effect.

**RESTORE:** Normally the used tracks of a PO data set will be restored (up to the last block pointer); DATA=ALL will restore all of the allocated tracks and should be used only when restoring from a dump taken with DATA=ALL. A physical restore will restore each track image for each selected track; the PDS will not be compressed. A logical restore will rearrange the data set, and update the PDS directory to point to the new location of each member (note lists will also be updated). Only live members (pointed to by a current directory entry) will be restored, so the PDS will be compressed. Diagnostics will be produced if invalid directory entries or members are found during the logical restore.

If reblocking is requested (BLKF= operand), the new physical blocksize will be indicated in the DSCB of the PDS, and will be used for new or updated members, but the existing members will not be reblocked during the restore. The restore will fail if any member has a block larger than the track size of the output disk.

PDS directories cannot be expanded in size during a restore. Even if the output data set is pre-allocated with a larger directory, the restore will reset it to its previous size. If you are licensed for FDRREORG, the REORG command of FDR copy may be used to expand directories ([See Section 21](#)).

**Warning:** A physical restore does not check whether the PDS directory fits in the first extent of the output data set. If it doesn’t the output data set will be unusable. A custom zap (C52.0512) is available to fail the restore of a PDS whose directory will go into more than one extent.

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## 52.15 CONTINUED . . .

**PARTITIONED  
EXTENDED  
(PDSE)**

PDSEs are supported only on SMS-managed volumes. Externally they are used like standard PO data sets, but internally they have 4K blocks and an expandable directory, and reuse space so that they rarely need compression.

DUMP: If the "last block pointer" in the F1 DSCB is valid, only tracks up to that pointer are dumped, unless DATA=ALL is in effect. At some system levels, the LBP for a PDSE is always zero; since LBPZERO=VALID is ignored for PDSEs, all tracks will be dumped.

RESTORE: If the LBP of the PDSE is valid, only tracks up to that pointer will be restored unless DATA=ALL is in effect; if it is zero all tracks will be restored. A physical restore, restores each track image. A logical restore will reformat the 4K blocks to fit on the new device; since pointers in a PDSE are by relative block number, not TTR, no other changes are made.

**DIRECT  
(DA-BDAM)**

DUMP: All of the allocated space in a BDAM data set is dumped, regardless of the last block pointer.

RESTORE: A physical restore will restore all allocated tracks in a BDAM data set. A logical restore will never reblock DA data sets, so it is used only for restores to unlike disk types.

Logical restore will not restore DA data sets which were created with absolute track addressing (OPTCD=A) or which have a blocksize larger than the tracksize of the output disk. Logical restore will rearrange the data blocks to fit on the new device type for fixed-length (RECFM=F/FB) data sets only; variable-length (RECFM=V/VB) or undefined length (RECFM=U) DA data sets will be restored by a physical ("track-image") restore and that restore will fail if the input data set has more data on a track than will fit on a track of the output disk.

A "track-image" restored DA data set may or may not be usable depending on the requirements of the program which accessed it; FDR has no way of knowing what those requirements are.

SAS data sets created by SAS Version 5 or below are a common type of BDAM RECFM=U data set (SAS is a program product of SAS Institute). SAS data sets can be restored to the same disk type (physical restore) with no special considerations. A logical restore to a new disk type uses the track-image mode described above, so they can be restored only to disks with a larger track size; after a logical restore they can be used by SAS, but it may be necessary to specify "DEVFMT=olddevicetype" (e.g., DEVFMT=3380) on a SAS LIBNAME statement; but a SAS PROC COPY should be done on them to reformat them properly for the new disk type. Because of this, SAS PROC COPY rather than FDRCOPY is recommended to move SAS Version 5 data sets to a new device type.

Sometimes SAS data sets are incorrectly marked as unmovable (DSORG=DAU), although SAS Institute assures us that there is no reason to do so and they are in fact movable. In that case the rules for Unmovable data sets will apply (see below), unless you correct the DSCB by turning off the Unmovable indicator. Contact INNOVATION if you need assistance restoring a SAS data set that was marked DSOrg=DAU when dumped.

As of SAS Version 6, SAS files are now PS (sequential) with RECFM=FS (Fixed standard); FDR handles these files without special considerations.

IAM (INNOVATION Access Method) data sets are BDAM RECFM=F (IAM is a separate software product from INNOVATION which is a high-performance replacement for ISAM and ICF VSAM). IAM data sets can be restored by logical and physical restore with no special considerations.

Other vendors may use BDAM files for databases. Contact INNOVATION or the vendor for information on FDR with these files.

**INDEXED  
SEQUENTIAL  
(IS-ISAM)**

DUMP: All of the allocated space in an ISAM data set is dumped.

RESTORE: Since ISAM data sets contain physical location dependent pointers, they must be restored to the exact same disk locations that they were dumped from. FDR cannot allocate an ISAM data set, so it must either be restored back on top of the original data set, or must be pre-allocated by the user with the exact extents it had when dumped; if the data set had separate prime, index, and overflow extents, they must all be allocated exactly as before. Logical restore of ISAM files to a new disk type is not supported. ISAM data sets cannot be restored to an SMS-managed volume.

ABR V5.0C and V5.0E could allocate space for ISAM data sets and do logical restores of them.

This function is still available in Version 5.2 but special procedures are required to invoke it. See member ISAM in the FDR ICL (Installation Control Library).

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## 52.15 CONTINUED . . .

**UNMOVABLE** Any of the 4 preceding data set types can be marked as unmovable in the Format 1 DSCB (via DSORG=PSU, POU, DAU, or ISU); ISAM data sets are unmovable even if DSORG=IS. An unmovable data set can be restored ONLY to the same track addresses on the output volume as it occupied on the input volume. If the data set does not already exist on the output volume, and it was allocated as a single extent on the input volume, FDR will attempt to allocate space for it at the same locations. If it occupied more than one extent on the input volume or if the required space is not free on the output volume, it cannot be allocated. If the user pre-allocates space for an unmovable data set, it must be allocated at the correct locations; if any extent is not at the same location, message FDR111 message is issued, indicating where the allocations should be made. Unmovable data sets cannot be restored to an SMS-managed volume.

**MODEL DSCBS** A model DSCB is a data set with no tracks allocated (zero extents). They are usually used as the model for a GDG (generation data group). ABR uses a model DSCB on each volume to contain options and information about ABR's use of the volume.

DUMP: Since there are no tracks associated with it, only the DSCB for the model is dumped in the control records on the backup data set.

RESTORE: If necessary, the model will be allocated with no extents. The restore will update the model with the characteristics of the original. Note that GDG models are usually uncataloged data sets which must exist on the same volume as the catalog in which the GDG is cataloged, so it may be a mistake to restore or copy them to a new volume. If model DSCBs are moved with FDRCOPY MOVE, FDRCOPY will be unable to catalog them and so will not scratch the original model DSCB (unless NOCAT is specified).

The ABR model DSCB (FDRABR.Vvolser) will never be restored or moved since its information relates to the volume it exist on. Any attempt to select it results in a warning message. The ABR model can be created or changed by the ABR ISPF dialogs (Option A.I.8) or by program FDRABRM.

**GENERATION DATA GROUPS (GDG)** DUMP: Since individual GDG generations are simple non-VSAM data sets, they are dumped normally based on their DSORG (usually PS).

RESTORE: GDG generations are also restored according to the rules for their DSORG, but there are considerations for cataloging them. GDGs have relative generation numbers (e.g., "(+1)" or "(—3)") and absolute generation numbers (e.g., G0023V00). By default, restore of a generation will allocate and catalog it under its original absolute number. If the current generations in that GDG all have higher absolute numbers, and the GDG index is full:

— If the GDG is in an OS CVOL catalog, the catalog will fail.

— If it is in an ICF catalog, catalog management will uncatalog (and may delete) the absolute generation that is currently the lowest one in the GDG (even if it is higher than the one being restored), and catalog the new one in its place. If multiple generations are being restored at one time, it may be that only the last one cataloged will be restored correctly.

GDGs can be renamed to a new relative generation number using the NEWNAME= or NEWINDEX= operands on the SELECT statement, e.g., NEWI=(+1) will restore a GDG as the next higher generation number.

See Section 52.50 for details on SMS-managed GDGs.

**STANDARD USER LABEL DATA SET (SUL)** Non-ICF data sets may be allocated with standard user-labels (LABEL=SUL) which allocates an extra track for the storage of user labels containing application-dependent information separate from the data. FDR will allocate such data sets correctly; if pre-allocated by the user, LABEL=SUL must be specified. The label track will always be restored with a physical (track-image) restore even if the data is being restored logically.

**DATABASE2 (DB2)** DB2 files are ICF VSAM clusters with a special format; they are non-indexed files with a 4K CISIZE and none of the usual internal VSAM indicators; DB2 manages all data in the file. They are usually allocated as LINEAR clusters but may be allocated as ESDS clusters. FDR recognizes them by the special format of their cluster and component names:

a. DSNDBx. b. c. I 0001. Annn

where a, b, and c are user-chosen, x is either C for the cluster or D for the component, and nnn is a numeric sequence number. Remember that FDR always processes ICF clusters by the cluster name (the DSNDBC name for DB2).

FDR can dump and restore DB2 files just like any other ICF VSAM cluster, including moving or restoring to unlike disks. There are only two restrictions:

- 1) if a DB2 file was allocated by DB2 onto a volume in a DB2 storage group (different from an SMS storage group), it can only be moved or restored to another volume in that same DB2 storage group.
- 2) Since DB2 files must be recorded by DB2, and FDR has no way to update this information, DB2 files cannot be moved/restored to a new name; to do so makes them unusable by DB2.

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## 52.15 CONTINUED . . .

**ICF VSAM** [Section 52.11](#) contains details on dump/restore support for ICF VSAM clusters. Special support for moving ICF VSAM clusters with FDRCOPY is documented in [Section 21.01](#).

**NON-ICF VSAM** FDR data set operations cannot easily be used for non-ICF VSAM clusters or dataspace.

Non-ICF VSAM are normally processed by full-volume dump and restore only. It is possible to dump and restore non-ICF dataspace (or clusters allocated with the UNIQUE attribute) by the dataspace or unique component name. However, FDR cannot allocate non-ICF dataspace or components, and information about the clusters (which is entirely contained in the associated non-ICF VSAM catalog) is not restored and may be out-of-sync with the data restored and may make the cluster unusable.

**VTOC** DUMP: The VTOC will always be dumped as a data set by full-volume dumps, by DSF if DSN=VTOD is specified, and by ABR for DUMP TYPE=ABR/AUTO. In addition, any full-volume or data set dump will dump all DSCBs relating to the data sets dumped into control records at the beginning of the backup data set.

RESTORE: Any data set restore requires that a DSCB exist in the output volume's VTOC before it can be restored; this can be created by FDR or pre-allocated by the user. At the end of the restore that DSCB will be updated with information from the saved DSCB from the backup data set. ([See Section 52.04 for details.](#)) The VTOC cannot be restored as a data set (although absolute track restore can be used to do so, e.g., SELECT FROM/TO), but it is usually a mistake to try to do so. FDRCOPY will never copy or move the VTOC.

**VTOD INDEX** DUMP: If the volume has an indexed VTOC (SYS1.VTODIX.xxxxxx), it will be dumped as a data set if selected, by full-volume dumps, and by ABR for DUMP TYPE=ABR/AUTO.

RESTORE: The indexed VTOC on an output volume is updated by allocation of data sets and can be reconstructed from the information in the VTOC by the IBM utility ICKDSF, so it is always a mistake to restore or copy it. Any attempt to select it results in a warning message.

**VVDS** DUMP: The VVDS (VSAM Volume Data Set, SYS1.VVDS.Vxxxxxx) will be dumped as a data set if selected, by full-volume dumps, and by ABR for DUMP TYPE=ABR/AUTO. Also, the VVDS records (VVRs for ICF VSAM and NVRs for non-VSAM SMS-managed data sets) are also recorded in control records at the beginning of the backup data set.

RESTORE: Allocation of the output data set by FDR or by the user will create the VVR and NVR in the VVDS of the output volume (the VVDS will be automatically created by allocation if it does not exist on the volume); FDR will update the VVR/NVR information at the end of the restore. It is almost always an error to try to restore the VVDS as a data set; any attempt to select it results in a warning message. More details are in [Section 52.11](#).

**OS CVOL CATALOG** DUMP: An OS catalog (called a CVOL) can be selected for dump by data set name "SYSCTLG\9  
RESTORE: A CVOL can be restored by a physical restore, again using name "SYSCTLG\9 The CVOL can be allocated by FDR, but its size cannot be increased. FDRCOPY will never scratch a CVOL, so a MOVE of a CVOL is treated the same as a COPY. Only one CVOL can exist on a volume, so be sure that you don't restore over an existing CVOL. Logical restores are not supported for CVOLs, so they cannot be moved to new disk types (use IEHMOVE to do so).

A CVOL is usable only if an entry exists in the master catalog under name "SYSCTLG.Vvvvvv" (where "vvvvv" is the volume serial it is on). When a CVOL is restored or moved to a new volume, use IDCAMS to define that entry and any aliases associated with it.

**ICF VSAM CATALOG** [Section 52.11](#) contains details on dump/restore support for ICF VSAM catalogs. FDRCOPY cannot be used to move or copy an ICF catalog, and ICF catalog cannot be restored to a new device type. IDCAMS Export/Import or Repro may be used.

## 52.16 GENERIC DATA SET NAME SELECTION

A function now is available which allows you to select data sets for processing using a generic name, also called a “data set name filter”. A version of this function was available in earlier releases as the XDSN= parameter in FDREPORT (See Section 53.25), but it is now supported in other FDR programs as well. The documentation for those programs will refer to this section wherever it is supported.

Generic data set name selection allows to you specify a filter which will be applied to all data sets selected from system catalogs, VTOCs, backup files, or the Archive Control File. The filter allows you a great deal of flexibility in specifying the names to be selected.

### **FILTER CHARACTERS**

The data set name filter is a string of characters which specify the data sets to be selected. Each character in the filter may represent a single character in the name of the data sets or may represent a variable number of characters. The filter characters may be:

any alphanumeric character (A-Z or 0-9) or national character (\$ # @) represents itself and must appear in the indicated position in the data set name.

/ (slash) or % (percent) represents ANY single valid alphanumeric or national character.

| (vertical bar) represents any single alphabetic (A-Z) character.

+ (plus) represents any single numeric (0-9) character.

? (question) represents any single national (\$ # @) character.

. (period) is used to separate index levels. For compatibility with earlier releases, if the filter begins with one or more periods, this indicates that that many index levels at the beginning of the name are to be skipped over before applying the rest of the filter.

\* (asterisk) by itself as an index level indicates that the index level must exist in the selected name, but that it can contain any valid characters and can be any valid length (1 to 8 characters). However, if a single asterisk is combined with other characters in an index level, then it represents a variable length string (zero or more characters) at that point in the index level.

\*\* (double asterisk with no trailing period) represents zero or more characters or index levels. The filter routine will try to apply the remainder of the filter to the data set name beginning with the current character and stepping through the name until it matches or until the end of the name is reached.

\*\*. (double asterisk with a trailing period) also represents zero or more characters or index levels, but the filter routine will try to apply the remainder of the filter to the data set name at the beginning of each index level (if not currently at the beginning of a level, it will start at the next level).

These special cases apply to \*\* with periods:

\*\*. at the beginning of the filter represents zero or more whole index levels at the beginning of the name

. \*\*. at the end of the filter represents zero or more whole index levels at the end of the name.

Note that in the XDSN= operand of FDREPORT, the implementation is slightly different: “\*\*.” and “.\*\*” represent ONE or more index levels at the beginning or end of the name.

**The examples that follow will make this clearer, and will show you how flexible filtering can be.**

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**52.16 CONTINUED . . .**

The examples below are designed to illustrate the power and flexibility you have in using FDR's generic data set name selection.

**EXAMPLE 1** ACCOUNTS. PAY\*\*

will select data set beginning with "ACCOUNTS.PAY" such as

ACCOUNTS. PAY. OVERDUE  
ACCOUNTS. PAYROLL. CHECKS

This is equivalent to the old DSF/ABR parameter DSG=ACCOUNT.PAY

**EXAMPLE 2** USER1. \*. CNTL

will select any 3-level data set name with USER1 as the first level and CNTL as the third, such as

USER1. JCL. CNTL  
USER1. TEST. CNTL

**EXAMPLE 3** USER+. \*\*. \*LI ST

will select any data set whose first index is USERn (n is numeric) and whose last index level ends in LIST (including LIST by itself) with any number of index levels between them, such as

USER1. LI ST  
USER3. I SPF. OUTLI ST  
USER9. TEST. PRI NT. MYLI ST

**EXAMPLE 4** \*\*TEST\*\*

will select any data set with the string TEST anywhere in the name, such as

ABC. TEST. GHI . XYZ  
TEST2. LI ST  
REPORT. CURRENT. TEST  
MYTEST

**EXAMPLE 5** \*\*A\*\*?\*B\*\*

will select any data set whose name contains an A, a national character, and a B, in that order, such as

SYS1. A. X#B  
APPLI C1. A@B. LOAD  
APPLI C2. MASTER. BALANCE\$. BOUNCE

**EXAMPLE 6** PAYROLL. %%| | +\*. FI LE

will select any three-level data set whose first index is PAYROLL, whose second index consists of any 2 characters, followed by any 2 alphabetic characters, followed by any 1 numeric character, and up to 3 more characters, and whose third index is FILE, such as

PAYROLL. DCLX5. FI LE  
PAYROLL. A4TV3LM. FI LE

**EXAMPLE 7** PAYROLL. //\*\*. FI LE. \*\*

will select any data set whose first index is PAYROLL, whose second index consists of at least 2 characters, and which has any number of following index levels, one of which must be FILE, such as

PAYROLL. DCLX5. FI LE  
PAYROLL. AB. FACTORY1. FI LE. OCT90  
PAYROLL. FACTORY2. HI STORY. FI LE

FDREPORT would only select data sets with at least one index level after the index FILE.

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52.16 CONTINUED . . .

**EXAMPLE 8** \*\*MASTER(—1)

will select the —1 generation of any GDG whose name ends in MASTER, such as

PROD1. WEEKLY. WI DGET. MASTER(—1)

FI NANCE. GLEDGER. XMASTER(—1)

This will only work when selecting data sets from the catalog (such as the CATDSN= operand).

**EXAMPLE 9** \*\*

will select all data sets.

**WARNING: Use \*\* with care, especially when doing ARCHIVE or SUPERSCRATCH.**

**SELECTING  
DATA SETS  
FROM THE  
CATALOG**

When generic data set selection is used to select data sets from system catalogs (such as the CATDSN= operand in ABR and FDRCOPY), one or more system catalogs will be searched depending on the filter specified.

By default, the search will start with the master catalog; if aliases are encountered which match the filter, the associated user catalogs will be searched as well. If there are enough explicit characters at the beginning of the filter, the search may be limited to one or a small number of user catalogs. For example, a filter of AB\*\* means that only those user catalogs associated with aliases beginning with AB need be searched. However, if the filter begins with generic characters (such as \*\*AB), then every user catalog with an associated alias in the master catalog must be searched. Although the catalog search is designed to be as efficient as possible, reading the catalogs directly whenever possible, this may still be a time-consuming process.

You can specify the name of a catalog to search instead of going through the master catalog; in ABR and FDRCOPY specify the CATALOG= parameter. In this case only data sets in that catalog will be selected; no other catalogs will be searched even if they exist as user catalogs in that catalog.

If you want to start your search with a master catalog which is NOT the master catalog of the system you are executing on, specify MCATALOG= instead and aliases will be searched.

GDGs (generation data groups) are treated specially when selected from a catalog:

- 1) the filter will be compared to the GDG base name (without the GnnnnVnn absolute generation). If it matches the base, then all generations in that GDG will be selected (unless limited by CATLIMITGDG= as shown below).
- 2) the filter will also be compared to the full name of each generation (including the GnnnnVnn). All generations which match the filter will be selected.
- 3) if the filter ends in a relative generation number in parenthesis (e.g, "PAYROLL.\*\*(—n)" or "PAYROLL.\*\* (0)\9) then only that generation will be selected from any GDGs selected (and the filter will not select any non-GDGs).
- 4) In ABR and FDRCOPY you can specify CATLIMITGDG=—n and only the (—n) generation of any GDGs which match the filter will be selected. However, the filter may also select non-GDG data sets.
- 5) In ABR and FDRCOPY you can also specify CATLIMITGDG=n and only the most recently created "n" generations of any GDGs which match the filter will be selected, The filter may also select non-GDG data sets.
- 6) For SMS-managed GDGs, any generations in rolled-out or deferred roll-in status will NOT be considered part of the GDG for selection; they will be treated as normal non-GDG data sets.

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## 52.16 CONTINUED . . .

**SELECTING  
DATA SETS  
FROM THE  
CATALOG  
(Continued)**

For ICF VSAM clusters, the filter will only be compared to the base cluster name. Component names and AIX names will not be tested.

Filter processing for catalogs will handle all VSAM catalogs, both ICF and old (non-ICF) VSAM catalogs. OS CVOLs will be bypassed, with the exception that if the filter specifies an explicit data set name, with no special selection characters, it will select that one name even if it is in a CVOL; this also supports selecting a single GDG generation from a CVOL by relative generation number.

STEPCAT and JOBCAT, if present, will be ignored unless the filter begins with an explicit high-level index (no special selection characters). In that case, only the STEPCAT or JOBCAT will be searched.

If an alias is encountered in a master catalog which points to a user catalog on a volume which is not currently mounted (or does not exist) that catalog will be bypassed.

By default, any errors scanning the catalogs (errors opening a catalog, internal errors in a catalog, or an alias which points to a CVOL) will result in a diagnostic message. In ABR and FDRCOPY, the operand CATBYPERR will bypass printing errors for CVOLs and catalog OPENS; internal errors will still be reported.

**SELECTING  
DATA SETS  
FROM OTHER  
SOURCES**

When generic data set selection is used to select data sets from sources other than the system catalogs (such as VTOCs or the Archive Control File), then the entire source will be scanned, since the names may be in random order. Each data set name taken from the input will be processed against all of the data set filters (such as multiple SELECT statements in ABR, DSF, and FDRCOPY).

GDG generations will be treated as normal data sets. There is no provision for selecting by relative generation number. It is not sufficient for the filter to match on just the GDG base name; the filter must take into account the GnnnnVnn absolute generation number at the end (e.g., "PAYROLL.MASTER.\*\*" or "PAYROLL.MASTER.G\*").

For ICF VSAM clusters, the filter will only be compared to the base cluster name; component names and AIX names will not be tested. However, FDREPORT will test component names.

**52.20 ABR AUTOMATIC RECALL — INTRODUCTION**

The ARCHIVE subsystem of ABR enables the installation to remove inactive data sets from disk, and the automatic recall feature of ABR allows the data sets to be recalled (restored) to disk automatically if they are later needed.

The ARCHIVE subsystem of ABR can select data sets based on how long ago they were last used, and/or many other criteria specified by the installation; [See Section 51](#) for details. The ARCHIVE process frees up the space occupied by the selected data sets, and stores the data sets either on a less expensive medium such as tape, or in a less expensive (compressed) form on disk. ABR uses a data base called the ARCHIVE control file to record the names and characteristics of the data sets that have been ARCHIVED and the locations of their ARCHIVE backup copies.

It is possible to restore an ARCHIVED data set by running a batch job, which may be submitted from the ABR ISPF dialog. This is called an “explicit restore”. However, with the automatic recall feature, explicit restores from ARCHIVE are not normally necessary. When a user references an ARCHIVED data set, ABR will restore it automatically. The reference may be from a batch job, from TSO, from ROSCOE, from dynamic allocation, or from an online system. Depending on the type of reference and on options selected by the installation and/or by the user, the recall may be performed immediately or may be deferred to be done in combination with other recalls. Details on the modes and options appear in the following Sections.

Automatic recall is performed by two Operating System exits that are supplied with the ABR system: the CATALOG LOCATE exit and the Data Set Not Found exit.

**CATALOG LOCATE EXIT**

The CATALOG LOCATE exit intercepts catalog requests (LOCATE SVCs). If the requested data set is cataloged, and the catalog entry indicates that the data set has been ARCHIVED with the RECALL option, then the CATALOG LOCATE exit arranges for FDRABR to restore the data set. The CATALOG LOCATE exit may invoke FDRABR directly within the address space requesting the data set, or may issue a START command to invoke FDRABR in a separate address space, or may place the restore request into the remote queue data set to be performed along with other ARCHIVE restores. Details appear in the following Sections.

**DATA SET NOT FOUND EXIT**

The Data Set Not Found exit receives control when an OPEN is issued for a disk data set and OPEN finds that the data set is missing from the VTOC. The Data Set Not Found exit invokes FDRABR. FDRABR searches the ARCHIVE control file to see whether the data set has been ARCHIVED (with or without the RECALL option). If the data set has been ARCHIVED, FDRABR restores it. If not, OPEN will issue a normal S213-04 ABEND. If FDRABR attempts to restore the data set and then internally ABENDs, OPEN will issue an S213-2C ABEND.

The Data Set Not Found exit should rarely be entered. In most cases, automatic recall will be done by the CATALOG LOCATE exit. That is, data sets will be restored during allocation, and will already be on disk when the program OPENS them. Generally, the Data Set Not Found exit will only be used for batch jobs that specify a volume serial on the DD statement, so that the data set is not retrieved through the catalog.

The Data Set Not Found exit always invokes FDRABR directly within the address space issuing the OPEN.

NOTE: When the Data Set Not Found exit is installed, any S213-04 ABEND will be preceded by the message

FDR316 RECALL DID NOT FIND REQUESTED DSN/DSG=dsname

This does not mean that FDR/ABR is the cause of the ABEND. The S213-04 means that the user requested a data set and the data set was not present on the disk. The reason might be that the user misspelled the dsname (if a volume serial was specified in the JCL). The FDR316 message just means that the data set did not happen to be ARCHIVED.

**WHAT FOLLOWS**

The detailed discussion of automatic recall is divided into the following Sections:

[52.21 DELETED](#)

[52.22 ABR AUTOMATIC RECALL — IMPLEMENTATION](#)

[52.23 ABR AUTOMATIC RECALL — OPERATION AND USAGE](#)

[52.24 ABR AUTOMATIC RECALL — INSTALLATION OPTIONS](#)

[52.25 ABR AUTOMATIC RECALL — SECURITY CONSIDERATIONS](#)

**52.22 ABR AUTOMATIC RECALL — IMPLEMENTATION**

Automatic recall is performed by two Operating System exits that are supplied with the ABR system: the CATALOG LOCATE exit and the Data Set Not Found exit.

The following is a list of the steps an installation should take to implement automatic recall:

- STEP 1** Install the CATALOG LOCATE exit and the Data Set Not Found exit. The recommended method for installing these exits is the dynamic installation procedure described starting in Section 92.50.
- STEP 2** [Section 92.52](#) gives the procedure for testing a new version of the exits when a previous version is already dynamically installed.
- STEP 3** The ARCHIVE Control file, which records the ARCHIVED data sets, must be allocated, cataloged, and formatted, as described starting in [Section 90.27](#). The standard name of the ARCHIVE control file is FDRABR.ARCHIVE. If the installation uses a different name, then the name must be specified as the value of the ARCDN option on ISPF panel A.I.4.5, or by executing program FDRZAPOP with the command ZAP ARCDN=dsname ([Section 91.04](#)).  
If remote queue restores will be done, then the remote queue data set for restores from ARCHIVE must be allocated and initialized as discussed in [Section 92.05](#), Step 11. The default name of this data set is FDRABR.ABRARCH.DATA. If the installation uses a different name, then the name must be specified as the value of the ARCHRSTQ option on ISPF panel A.I.4.5, or by executing program FDRZAPOP with the command ZAP ARCHRSTQ=dsname ([Section 91.04](#)).
- STEP 4** Security — If your installation has a data security system, you may need to give authorization to all users to access the ARCHIVE Control file for UPDATE, when the access is made by a program whose name starts with the characters 'FDR', and that was loaded from the FDR program library. This is not necessary if the LXBYPSEC option is enabled ([See Section 52.25](#)).
- STEP 5** Program FDRABR ([Section 51](#)) performs the ARCHIVE of data sets. The RECALL option must be in effect to ARCHIVE data sets for automatic recall. The RECALL option will be in effect if RECALL or RECALL=YES is specified on the DUMP TYPE=ARC command, or if the ARCRECALL option has been set to YES on ISPF panel A.I.4.4 (if using FDRZAPOP, the command to set this option to YES is ZAP ENABLE=ARCRECALL). The RECALL option causes FDRABR to leave the ARCHIVED data sets as cataloged. The default is that ABR will uncatalog a data set it has ARCHIVED. If the data set is uncataloged when a job references the data set through the catalog, a JCL error will be issued. If the RECALL option is in effect, ABR recatalogs the data set with a special catalog entry containing 3 bytes of ABR information (stored in the DSCBTTR field). The volume serial in the catalog entry will reflect the volume from which the data set was ARCHIVED; except that if the MIGRAT option is in effect, the volume serial will be MIGRAT. The MIGRAT option will be in effect if MIGRAT=YES is specified on the DUMP TYPE=ARC command, or if the MIGRAT option has been set to YES on ISPF panel A.I.4.4 (if using program FDRZAPOP, the command to set this option to YES is ZAP ENABLE=MIGRAT).  
**The MIGRAT option must be used if you are ARCHIVING data sets from SMS-managed volumes.**  
If an ICF VSAM cluster is ARCHIVED, ABR will recatalog the cluster name as non-VSAM. If a DB2 cluster is ARCHIVED (as indicated by the name), ABR will also recatalog the data component name as non-VSAM. The MIGRAT option is honored for DB2 clusters.  
Notes for multi-volume data sets:  
1. Both VSAM and non-VSAM multi-volume data sets are supported for ARCHIVE.  
2. When a non-VSAM multi-volume data set is ARCHIVED, each volume on which the data set resides is processed separately. The data set may be ARCHIVED from all of its volumes, or it may be ARCHIVED from some volumes and remain on disk on other volumes (e.g. if ARCHIVE is not run on those volumes). When the data set is referenced, ABR will recall whichever portions of the data set have been ARCHIVED.  
3. When a VSAM multi-volume data set is ARCHIVED, all of the volumes on which the data set resides must be processed in the same ABR step. See the NEWS member in the Installation Control Library (ICL) for considerations on ARCHIVING multi-volume VSAM.  
4. If the MIGRAT option is in effect, for non-VSAM the first volume serial will be set to MIGRAT, and the later volume serials will continue to reflect the original volumes. For multi-volume VSAM, the MIGRAT option is ignored, and all volume serials continue to reflect the original volumes.  
5. The ABR information that would be stored in the DSCBTTR field for a single-volume data set, is stored in the file sequence number field for each volume of a multi-volume data set. LISTCAT will show strange values in the FSEQN field.

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**52.22 CONTINUED . . .**

- STEP 6** Using DASD as the backup medium. It is recommended that if DASD is to be used as the primary backup medium, a pool of volumes should be set up exclusively for the use of ARCHIVE. [Section 51](#), under the TAPEX DD statement, details how to set up a pool of disks. The purpose of using disk as the backup medium is for easy access to the backup data sets during a restore request.

The TAPEX DD statement (COPY1) should specify the DASD backup devices. The retention period (LABEL=RETPD) should be coded on the TAPEX DD statement. The retention period for the backups on disk should be short, usually 30 to 90 days. A TAPEXX DD statement should also be specified pointing to a tape unit. This will create a duplicate backup of the ARCHIVED entries. The retention period of the duplicate copy should be for the length of time the data set(s) are to be kept. The COMPRESS=ALL option will save space by reducing the size of the backup data sets.

- STEP 7** Cleanup of the DASD volumes — If a duplicate copy was made on tape at ARCHIVE time, the ABR user can scratch the backup data sets residing on disk after a relatively short time, and still be able to recall the data sets. ABR supplies a simple procedure to scratch the backup data sets from disk when they expire. A SUPERSCRATCH operation (TYPE=SCR) is performed using the SELECT ABRBKUP statement. The user specifies the backup volumes on the DISKxxxx DD statements or by a MOUNT VOLG command. This operation will scratch and uncatalog backup data sets which have expired. The DASD volumes must be enabled for SUPERSCRATCH using ISPF panel A.I.8, or the MAINT command of program FDRABRM.

The above approach leaves you with just one copy of the ARCHIVE files. If you prefer to have a second copy on tape after the disk copy expires, then use program FDRTSEL instead of SUPERSCRATCH. FDRTSEL can move the expiring ARCHIVE backup files from disk to tape, deleting them from disk and giving the new tape copy an extended retention period. FDRTSEL can be scheduled as a production job to run at any desired frequency. [See Section 10.15](#) for details.

- STEP 8** ARCHIVE Restore Selection — ABR normally will use the COPY1 backup of the ARCHIVED data set, unless COPY1 has expired; then ABR will use the duplicate backup (COPY2) if it exists. If COPY1 has expired but it is available, the user can code TAPE=EXP on the RESTORE TYPE=ARC control statement using a batch job to restore the data set(s). If option ARCCOPY is set to 2 in the FDR/ABR Global option table, then the restore will bypass COPY1 and restore from COPY2 (this may be useful at a disaster recovery site).

- STEP 9** Dynamic Allocation — ABR will dynamically allocate all the DD statements it needs to do the restore. The ARCHIVE Control file (see Step 3) will be allocated to a ddname of ARCHIVE#. The backup data set will be allocated to TAPE#. If a tape is to be mounted, the operating system will give the operator a message enabling him or her to cancel the mount request. The ddnames ARCHIVE# and TAPE# must not appear in the user's JCL.

Note that if the ARCHIVED data sets are on tape, TSO users cannot do automatic recall in the foreground unless they have MOUNT authority.

- STEP 10** Restore volume — Whenever the CATALOG LOCATE exit initiates a restore for an ARCHIVED data set, using any restore type, the CATALOG LOCATE exit designates an output volume to which the data set should be restored. The default is that the designated volume is the volume to which the data set is cataloged (which is either the volume from which the data set was ARCHIVED, or 'MIGRAT' if the MIGRAT option was in effect when the data set was ARCHIVED; see STEP 5). The topic "Output Volume for Recall" at the end of the [Section 52.24](#) discusses the interaction among the various options that may change the volume that is designated as the output volume for the restore.

The Data Set Not Found exit can only restore the data set to the volume specified on the DD statement. Sufficient space must be available on this volume for ABR to restore this data set.

- STEP 11** Eligible Data Sets — The CATALOG LOCATE exit will recall all types of data sets except for non-ICF VSAM.

The Data Set Not Found exit only supports non-VSAM. The Data Set Not Found exit will not restore a data set opened for output if the disposition on the JCL specifies NEW, or if it is not the first volume of the data set.

**52.23 ABR AUTOMATIC RECALL — OPERATION AND USAGE**

**ENVIRON-  
MENTS** The CATALOG LOCATE exit supports recalls in a variety of environments: TSO, step initiation, background dynamic allocation, and ROSCOE. Processing is different depending on the environment, as discussed in detail later in this Section.

The Data Set Not Found exit is not sensitive to the environment; it always processes in the same way, by invoking FDRABR in the address space issuing the OPEN.

**RESTORE  
TYPES** The CATALOG LOCATE exit supports recalls using several types of restores: invoke FDRABR in the address space issuing the LOCATE; synchronous external restore; asynchronous external restore; and remote queue restore.

The Data Set Not Found exit always invokes FDRABR directly within the address space issuing the OPEN.

**INVOKE  
FDRABR IN  
THIS ADDRESS  
SPACE** The CATALOG LOCATE exit or the Data Set Not Found exit may invoke FDRABR directly to restore the requested data set(s) in the address space issuing the LOCATE or OPEN. The CATALOG LOCATE exit uses this type of restore for TSO when the user specifies FG; for step initiation; and for background dynamic allocation. The Data Set Not Found exit always invokes FDRABR directly within the address space issuing the OPEN. The TSO user or background job waits until the restore is completed.

When a recall is performed by invoking FDRABR in the address space issuing the LOCATE or OPEN, sufficient storage must be available in that address space for ABR to perform the restore. The basic requirement for the ABR restore is 512K, but the requirement may be much more, depending on such factors as whether the backup is compressed, whether the restore is physical or logical, and the DSORG of the data set being restored. If a recall is performed under step initiation, the CATALOG LOCATE exit dynamically increases the REGION size to 1536K if it was smaller than that. In other cases the recall will fail if sufficient storage is not available.

**SYNCHRO-  
NOUS  
EXTERNAL  
RESTORE** The CATALOG LOCATE exit initiates a synchronous external restore by issuing a START command for the SYNRECAL cataloged procedure, and then waiting for SYNRECAL to complete. This type of restore is used for TSO when the user specifies FG and an ABRSYNCH DD statement is allocated; for certain special data sets under step initiation; for background dynamic allocation when an ABRSYNCH DD statement is allocated; and for ROSCOE when the DSNRECALL option is set to WAIT. The user or background job waits until the restore is completed. On TSO, if the user presses the Attention or PA1 key, the CATALOG LOCATE exit stops waiting and converts the restore to an asynchronous external restore.

**ASYN-  
CHRONOUS  
EXTERNAL  
RESTORE** The CATALOG LOCATE exit initiates an asynchronous external restore by issuing a START command for the SYNRECAL cataloged procedure, and then giving a 'not cataloged' return code to LOCATE, without waiting for SYNRECAL to complete. This type of restore is used for TSO when the user specifies BG, or when the user specifies FG and an ABRASYNC DD statement is allocated; for background dynamic allocation when an ABRASYNC DD statement is allocated; and for ROSCOE when the DSNRECALL option is set to NOWAIT. The user or background job receives control back while the restore is being performed. If the recall was on behalf of a TSO or ROSCOE user, the user receives a message on his terminal when the restore is completed, and he can then access the recalled data set.

**LIMITING  
CONCURRENT  
RECALLS** In installations where there is a lot of recall activity, you may wish to limit the maximum number of concurrent external recalls (started tasks) or total RECALLS. Options LXMAXSTL and LXMAXREC respectively will do this. RECALLS which would cause the maximums to be exceeded will wait until other recalls complete. An ABRNOLIM DD statement may be added to a job step to make it exempt from these limits.

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## 52.23 CONTINUED . . .

**REMOTE  
QUEUE  
RESTORE**

The CATALOG LOCATE exit initiates a remote queue restore by invoking the Remote Queue Utility FDRABRUT in the address space issuing the LOCATE, and then giving a 'not cataloged' return code to LOCATE. FDRABRUT adds the restore request to the remote queue data set. The name of the remote queue data set is specified by the ARCHRSTQ option ([Section 91.04](#)). The procedure to allocate and initialize the remote queue data sets is in [Section 92.05](#), Step 11. The installation must schedule a job to run at some interval, such as once a day or once every half hour, to service the remote queue requests. An example of the JCL for the remote queue restore appears in [Section 51.10](#).

Remote queue restore is used for TSO when the user specifies RQ. The TSO user receives control back after the restore request has been added to the remote queue. The user receives a message on his terminal when the restore is completed, and he can then access the recalled data set.

**ENVIRON-  
MENTS**

Now that we have defined the restore types, we will discuss how the CATALOG LOCATE exit processes in each environment.

**TSO**

If a TSO user dynamically allocates a data set which has been ARCHIVED, the user will be notified that the data set has been ARCHIVED and requires an ABR restore. The user can choose:

- 1) Whether or not to restore the data set.
  - 2) Whether to restore the data set to the original disk volume from which it was ARCHIVED, or to a different volume.
  - 3) Whether the restore should be performed in the foreground, in the background, or via the remote queue.
- If the choice is foreground, and the DD statements ABRSYNCH and ABRASYNCH are not allocated, then the restore will be performed immediately as part of the user's TSO session, by invoking FDRABR in the user's address space. If the data set has been ARCHIVED to tape, this option requires either that the user have MOUNT authority, or that the installation sets the ALLOCATEFLAG MOUNT option to YES on ISPF panel A.I.4.4, or by executing program FDRZAPOP with the command ZAP ALLOCATEFLAG=MOUNT ([Section 91.04](#)).
  - If the choice is foreground, and an ABRSYNCH DD statement is allocated, the restore will be performed as a synchronous external restore. Use of an external address space will NOT require the user to have MOUNT authority.
  - If the restore in the foreground fails (e.g.: copy 1 on disk has expired, the restore attempted to use copy 2 which is on tape, and the user does not have MOUNT authority), the LXFGERR option may direct the CATALOG LOCATE exit to retry the restore in the background or via the remote queue.
  - If the choice is background, the restore will be performed as an asynchronous external restore. The user will be able to do other work at the terminal while the restore proceeds. The user will be notified when the restore is completed.
  - If the choice is remote queue, the restore request will be placed in the remote queue for ARCHIVE restores. The next ABR restore job which references this remote queue will restore the data set. The user will be notified when the restore is completed.

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## 52.23 CONTINUED . . .

**STEP  
INITIATION**

If one or more Job Control DD statements reference data set(s) that were ARCHIVED, the names of the data set(s) to be restored from the ARCHIVE subsystem are queued in storage until just prior to the user's program getting control, when they are restored by a single invocation of ABR within the address space requesting the data sets. If more than one data set is to be restored from a tape reel, ABR will restore them without an intervening re-mount of the tape reel.

Exception: When running under step initiation, several categories of data sets will be recalled by a synchronous external restore (START command) for the individual data set, even if there are other data sets in the same jobstep that are recalled in the normal way by being combined into a single restore operation. These categories are:

- STEPLIB/JOBLIB. These data sets must be recalled immediately because the initiator OPENS them before the time of the combined recall.
- DCB references (DCB=dsname). The referenced data set must be recalled immediately because the initiator reads the DSCB to extract the DCB characteristics while processing the JCL, before the time of the combined recall.
- Data sets that are concatenated to a temporary data set that specifies DISP=(OLD,DELETE). These data sets must be recalled immediately because it would not be possible to rebuild the concatenation if they were recalled to a different volume.
- Volume references (VOL=REF=dsname), if the referenced data set has been recataloged to MIGRAT. The referenced data set must be recalled immediately because VOL=REF requires the serial number of a real volume, which MIGRAT is not.

**BACKGROUND  
DYNAMIC  
ALLOCATION**

If a batch job dynamically allocates an ARCHIVED data set using SVC 99, ABR will immediately restore the data set by invoking FDRABR in the address space of the batch job or with an external started task (see "ABRSYNCH and ABRASYNCH" below).

**ROSCOE**

The CATALOG LOCATE exit supports automatic recall for ROSCOE (Release 5.6 or higher). To activate the support in ROSCOE for automatic recall, the installation must install a ZAP for ROSCOE. For example, for ROSCOE release 5.7, the ZAP is ROSCOE ZAP NOTICE R5709140.

The ROSCOE user can use the SET DSNRECALL command to specify which type of restore he wants to use: NONE (do not attempt to recall ARCHIVED data sets), WAIT (restore ARCHIVED data sets synchronously), or NOWAIT (restore ARCHIVED data sets asynchronously). The default is WAIT. If DSNRECALL is set to NONE, no restore will be performed and ROSCOE will be informed that the data set is not cataloged. If DSNRECALL is set to NOWAIT, the CATALOG LOCATE exit will perform an asynchronous external restore. ROSCOE will be informed that the data set is not cataloged, and messages will be sent to the user (via the ROSCOE NOTIFY service) stating the data set is being restored. If DSNRECALL is set to WAIT, the CATALOG LOCATE exit will perform a synchronous external restore, and ROSCOE will be informed when the restore is complete. Messages will be sent to the user (via the ROSCOE NOTIFY service) documenting the restore activity.

\* \* \*

The following special DD statements may be used within an individual jobstep or TSO session to set options for automatic recall.

**ABRSYNCH  
and  
ABRASYNCH**

If an ARCHIVED data set is requested by background dynamic allocation, the CATALOG LOCATE exit normally recalls the data set by invoking FDRABR within the address space requesting the data set. Similarly, if a TSO user requests an ARCHIVED data set, and either the user specifies a foreground (FG) restore, or foreground is the only type of restore that the installation normally allows, the CATALOG LOCATE exit normally recalls the data set by invoking FDRABR within the address space requesting the data set. In these cases, if a ddname of ABRSYNCH has been allocated by a DD statement or by a TSO ALLOCATE command, the restore will instead be performed as a synchronous external restore; or if a ddname of ABRASYNCH has been allocated, the restore will be performed as an asynchronous external restore.

In batch, code the DD statement as //ABRSYNCH DD DUMMY or //ABRASYNCH DD DUMMY. Under TSO READY mode, or under ISPF option 6, issue the command ALLOCATE FILE(ABRSYNCH) DUMMY or ALLOCATE FILE(ABRASYNCH) DUMMY.

Note that an ABRSYNCH or ABRASYNCH DD statement has no effect on recalls under step initiation or under ROSCOE.

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## 52.23 CONTINUED . . .

- ABRIGNOR** If a ddname of ABRIGNOR has been allocated by a DD statement or by a TSO ALLOCATE command, the CATALOG LOCATE exit will bypass the restore. As a default, the CATALOG LOCATE exit will give a successful return code to LOCATE.
- In batch, code the DD statement as //ABRIGNOR DD DUMMY . Under TSO READY mode, or under ISPF option 6, issue the command ALLOCATE FILE(ABRIGNOR) DUMMY .
- ABRIGNRD** If a ddname of ABRIGNRD has been allocated by a DD statement or by a TSO ALLOCATE command, the Data Set Not Found exit will bypass invoking FDRABR to restore the data set. OPEN will then give an S213-04 ABEND. The main use for ABRIGNRD is in cases where it is known that any data sets that are missing from disk are not likely to have been ARCHIVED by ABR.
- In batch, code the DD statement as //ABRIGNRD DD DUMMY . Under TSO READY mode, or under ISPF option 6, issue the command ALLOCATE FILE(ABRIGNRD) DUMMY .
- ABRNOLIM** If a ddname of ABRNOLIM has been allocated by a DD statement or by a TSO ALLOCATE command, the CATALOG LOCATE exit will make this job step or user exempt from the limits on concurrent recalls set by the LXMAXSTC and LXMAXREC options.
- In batch, code the DD statement as //ABRNOLIM DD DUMMY . Under TSO READY mode, or under ISPF option 6, issue the command ALLOCATE FILE(ABRNOLIM) DUMMY .
- ABRLIB** If the CATALOG LOCATE exit or the Data Set Not Found exit finds that an ABRLIB DD statement is present, then the module (FDROPT) containing the installation options may be read from the ABRLIB library, and if the recall is performed in the address space that issued the LOCATE or OPEN, then FDRABR will be invoked from the ABRLIB library. The following paragraphs explain this in more detail.
- Under the Data Set Not Found exit, if ABRLIB is present, then it will always be used both for reading FDROPT and for invoking FDRABR.
- Under the CATALOG LOCATE exit, if a recall or remote queue update is performed in the address space that issued the LOCATE, then FDRABR or FDRABRUT will always be invoked from the ABRLIB library. When invoked in this way, FDRABR or FDRABRUT will use the copy of FDROPT in the ABRLIB library, if any.
- Under the CATALOG LOCATE exit, an ABRLIB DD statement is not fully effective for setting different values for options that are used by the CATALOG LOCATE exit, i.e. options whose names start with "LX". (If the CATALOG LOCATE exit is dynamically installed ([Section 92.50](#)), then some or all of these options will be extracted from the copy of FDROPT in the Active Link Pack Area instead of from the copy in the ABRLIB library; if the CATALOG LOCATE exit is statically installed ([Section 90.12B](#)), then some or all of these options will be set from the built-in defaults instead of from ABRLIB.) Instead, the recommended method for causing the CATALOG LOCATE exit to obtain all of the "LX" options for a particular job or group of jobs from a different copy of FDROPT is to dynamically install a second copy of the exit(s) using the procedure in [Section 92.52](#). Note that if the different options affect FDRABR or FDRABRUT as well as the CATALOG LOCATE exit (i.e. options other than "LX" are different), then the job(s) using the different FDROPT will still need an ABRLIB DD. Item D of [Section 92.52](#) contains further details.

**52.24 ABR AUTOMATIC RECALL — INSTALLATION OPTIONS**

This Section describes options for automatic recall that are set for the installation as a whole. Options that may be set for an individual jobstep or TSO session or for an individual recall operation are described in the preceding Section on “Operation and Usage”.

**SETTING  
OPTIONS**

The auto-recall options described in this section can be changed using the ABR ISPF panels (panels A.I.4.11.2 and A.I.4.11.3, as described in [Section 92](#)) or using the FDRZAPOP program as in [Section 91](#). The values for the options shown can be entered on the ISPF panels; the FDRZAPOP commands to set the options are also shown. The CATALOG LOCATE and data set not found exits access module FDROPT in the FDR/ABR load library to read the setting so these options. However, if you are using the recommended dynamic installation of the exits as described in [Section 92.50](#), the FDRSTART program will load a permanent copy of FDROPT into memory for use by the exits. If you change auto-recall options, they will not be effective until you refresh FDROPT ([See Section 52.51](#)).

The following options affect only the CATALOG LOCATE exit, unless the description of the option mentions that it affects the Data Set Not Found exit also.

**LXFOREST**

Specifies whether the CATALOG LOCATE exit will ask a TSO user to confirm the restore, when the exit finds that the user has referenced a data set that is ARCHIVED for recall. This option has no effect if options LXDFREST and LXUNCAT are both set to NO.

**YES** — specifies that the CATALOG LOCATE exit will issue message FDRW71 asking the TSO user to confirm or deny the restore. The format of message FDRW71 can be changed by option LXALTMSG. With FDRZAPOP, specify ZAP DISABLE=LXFOREST.

**NO** — specifies that the CATALOG LOCATE exit will not issue message FDRW71; the TSO user is not asked to confirm or deny the restore; the restore is forced. With FDRZAPOP, specify ZAP ENABLE=LXFOREST.

The default is YES.

**LXDFREST**

Specifies the restore types that are available for automatic recalls for TSO users. The values that may be specified are NO or any combination of FG, BG, and RQ. If more than one restore type is specified, the TSO user will be prompted to choose which restore type to use. If only one restore type is specified, that restore type will be used automatically, and the TSO user will not be prompted. The restore types are described in [Section 52.23](#) “Operation and Usage”.

**NO** — specifies that automatic recall is not available for TSO users.

**FG** — foreground recalls are available.

**BG** — background recalls are available.

**RQ** — remote queue recalls are available.

The default is FG,BG,RQ; that is, all of the restore types are available, and the user will be prompted to choose one.

If using FDRZAPOP, the command to set this option is ZAP LXDFREST=NO or ZAP LXDFREST=type or ZAP LXDFREST=(type,type) or ZAP LXDFREST=(type,type,type), where “type” is FG or BG or RQ.

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## 52.24 CONTINUED . . .

**LXFGERR** Specifies whether a recall should be retried in the background or via the remote queue, if it fails in the TSO foreground. This option has no effect unless option LXDFREST includes FG as an available restore type.

**NO** — specifies that a failed foreground recall will not be retried.

**BG** — specifies that a failed foreground recall will be retried as a background recall.

**RQ** — specifies that a failed foreground recall will be retried as a remote queue recall.

If using FDRZAPOP, the command to set this option is ZAP LXFGERR=retrytype, where 'retrytype' is NO or BG or RQ.

The default is NO.

LXFGERR is an important option in the environment where data sets are ARCHIVED to disk with a short retention and to tape with a longer retention, and the TSO users do not have MOUNT privileges. As long as an ARCHIVED data set is available on disk, it can be quickly be recalled in the foreground. After the disk copy expires, ABR will automatically try to restore from the tape copy, but the dynamic allocation will fail because the user does not have MOUNT privileges. If LXFGERR is set to BG or RQ, the recall will automatically be sent to the background or the remote queue, where the tape can be mounted.

Note that you can specify BG or RQ even if BG or RQ is not specified as a valid restore type under LXDFREST. For example, if you specify FG as the only value for LXDFREST, and you specify BG as the value for LXFGERR, then all recalls will initially be tried in the foreground, and those that fail will automatically be retried via START commands.

**LXNOMSG** Specifies whether the CATALOG LOCATE exit will issue or suppress messages FDRW70 and FDRW79, when the exit finds that the user has referenced a data set that is ARCHIVED for recall, but the installation does not allow automatic recalls for TSO users. This option has no effect unless options LXDFREST and LXUNCAT are both set to NO.

**YES** — suppress the messages. With FDRZAPOP, specify ZAP ENABLE=LXNOMSG.

**NO** — issue messages FDRW70 and FDRW79, eligible for recall but recall is disabled under TSO. With FDRZAPOP, specify ZAP ENABLE=LXNOMSG.

The default is NO.

**LXNEWVOL** Specifies whether the CATALOG LOCATE exit will permit the TSO user to designate a new output volume to which to restore an ARCHIVED data set.

**YES** — specifies that the CATALOG LOCATE exit will issue messages FDRW76 and FDRW77, telling the TSO user the volume that is designated as the output volume for the restore, and permitting a different volume to be specified. With FDRZAPOP, specify ZAP ENABLE-LXNEWVOL.

**NO** — specifies that messages FDRW76 and FDRW77 will not be issued, and the TSO user will not have the option to override the chosen volume serial. With FDRZAPOP, specify ZAP DISABLE-LXNEWVOL.

The default is YES. However, in many installations users do not get involved in choosing specific output volumes, and the selection of output volumes may be automated by the FDR RESTORE ALLOCATION LIST, SMS, or other products, so you will probably want to change this to NO.

The topic "Output Volume for Recall" at the end of this Section discusses the interaction among the various options that may change the designated volume, namely LXCONUSE, LXCONVOL, LXCHKSEC, LXEXIT, LXNEWVOL, and LXREISSU.

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## 52.24 CONTINUED . . .

**LXREISSU** Specifies whether the CATALOG LOCATE exit will re-display the designated volume and give the TSO user another chance to change it, after the user has designated (in response to the messages for option LXNEWVOL) a new output volume to which to restore an ARCHIVED data set. This option has no effect if either option LXDFREST or option LXNEWVOL is set to NO.

**YES** — specifies that when the user has replied to message FDRW77 by designating a new output volume to which to restore the data set, the CATALOG LOCATE exit will reissue messages FDRW76 and FDRW77. Message FDRW76 will re-display the new volume that the user has designated, and message FDRW77 will give the user another chance to change it. With FDRZAPOP, specify ZAP ENABLE=LXREISSU.

**NO** — specifies that the TSO user will have only one chance to designate a new output volume to which to restore the data set. With FDRZAPOP, specify ZAP DISABLE=LXREISSU.

The default is NO.

**LXSYNPROC** Specifies the name of the cataloged procedure that will be STARTed by the CATALOG LOCATE exit to perform synchronous external restores and asynchronous external restores. With FDRZAPOP, specify ZAP LXSYNPROC=procname.

The default is SYNRECAL.

When installing the CATALOG LOCATE exit, you must copy the SYNRECAL cataloged procedure from the ABR Installation Control Library (ICL) to a cataloged procedure library that is available to JES for START commands. The installation may give this cataloged procedure a name other than 'SYNRECAL'; if so, specify the new name as the value of the LXSYNPROC option. Further details are in Sections 92.51 and 92.52.

**LXCHKSEC** Specifies whether the CATALOG LOCATE exit itself will perform security checking before recalling an ARCHIVED data set. This is in addition to security checking that may be done by FDRABR during the restore or by FDRABRUT during the remote queue update. [Section 52.25](#) "Security Considerations" gives further details. This option has no effect if global options ALLCALL, RACF, and SECEXIT are all set to NO.

**YES** — specifies that the CATALOG LOCATE exit will perform security checking. In addition, if the LXCHKSEC and SECEXIT options are both set to YES, the Data Set Security exit may designate a new volume as the output volume for the restore, also as detailed in the following Section. The topic "Output Volume for Recall" at the end of this Section discusses the interaction among the various options that may change the designated volume, namely LXCONUSE, LXCONVOL, LXCHKSEC, LXEXIT, LXNEWVOL, and LXREISSU. With FDRZAPOP, specify ZAP ENABLE=LXCHKSEC.

**NO** — specifies that the CATALOG LOCATE exit will not perform security checking.

The default is NO.

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## 52.24 CONTINUED . . .

**LXBYPSEC** Specifies whether the CATALOG LOCATE exit and the Data Set Not Found exit will cause security checking to be bypassed during the restore. This option is separate from the LXCHKSEC and LXEXIT options, which control security checking that may be done by the CATALOG LOCATE exit itself. [Section 52.25](#) “Security Considerations” gives further details.

**YES** — specifies that the CATALOG LOCATE exit will cause security checking to be bypassed when it invokes FDRABRUT to add the restore request to the remote queue, or when it invokes FDRABR to perform the restore. the Data Set Not Found exit will also bypass security checking when it invokes FDRABR to perform the restore. The bypass is effective for RACF, TOP SECRET, ACF2, and other security systems. The bypass applies both to security checking that FDRABR and FDRABRUT perform explicitly, and to security checking performed by Operating System routines that FDRABR and FDRABRUT invoke.

With FDRZAPOP, specify ZAP ENABLE=LXBYPSEC

**NO** — specifies that normal security checking will be performed under FDRABR and FDRABRUT. This may mean that users will not be able to recall datasets unless they have the authority to allocate them. With FDRZAPOP, specify ZAP ENABLE=LXBYPSEC

The default is NO.

**LXEXIT** Specifies whether the CATALOG LOCATE exit will invoke a special security exit. [Section 52.25](#) “Security Considerations” gives further details.

**YES** — specifies that the CATALOG LOCATE exit will call a special security exit. detailed in the following Section. The name of the exit must be specified in the LXEXIT ... EXIT NAME option. In addition to checking security, the LXEXIT exit may designate a new volume as the output volume for the restore, also as detailed in the following Section. The topic “Output Volume for Recall” at the end of this Section discusses the interaction among the various options that may change the designated volume, namely LXCONUSE, LXCONVOL, LXCHKSEC, LXEXIT, LXNEWVOL, and LXREISSU. With FDRZAPOP, specify ZAP ENABLE=LXEXIT,LXEXIT=exitname.

**NO** — specifies that the CATALOG LOCATE exit will not call a special security exit. With FDRZAPOP, specify ZAP DISABLE=LXEXIT

The default is NO. There is no default for the name of the exit; if you activate the exit you must specify its name.

**LXNCDENY** Specifies whether the CATALOG LOCATE exit will give a 'not cataloged' return code to LOCATE, when a TSO user references a data set that has been ARCHIVED for recall, and the TSO user specifies that the data set should not be recalled. This option has no effect if options LXDFREST and LXUNCAT are both set to NO.

**YES** — specifies that the CATALOG LOCATE exit will give a 'not cataloged' return code to LOCATE, when a TSO user denies the recall request. With FDRZAPOP, specify ZAP ENABLE=LXNCDENY.

**NO** — specifies that the CATALOG LOCATE exit will give a successful return code to LOCATE, when a TSO user denies the recall request. With FDRZAPOP, specify ZAP DISABLE=LXNCDENY.

The default is YES.

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## 52.24 CONTINUED . . .

**LXCONUSE** Specifies whether the CATALOG LOCATE exit will initially designate the constant new volume serial specified by the LXCONVOL option as the output volume for automatic recall. The topic “Output Volume for Recall” at the end of this Section discusses the interaction among the various options that may change the designated volume, namely LXCONUSE, LXCONVOL, LXCHKSEC, LXEXIT, LXNEWVOL, and LXREISSU.

**YES** — specifies that the CATALOG LOCATE exit will initially designate the LXCONVOL volume as the output volume for recall. With FDRZAPOP, specify ZAP  
ENABLE=LXCONUSE,LXCONVOL=volser

**NO** — specifies that the CATALOG LOCATE exit will initially designate the volume to which the data set is cataloged as the output volume for recall. With FDRZAPOP, specify ZAP  
DISABLE=LXCONUSE.

The default is NO.

The usual use of the LXCONUSE/LXCONVOL options is to designate a non-existent volume in order to force ABR to select a volume using the RESTORE Allocation Control List.

**LXCONVOL** Specifies the constant new volume serial that the CATALOG LOCATE exit will specify as the output volume for automatic recall, if the LXCONUSE option is set to YES.

The default is NEWVOL.

**LXALTMSG** Specifies whether the CATALOG LOCATE exit will use an alternate format for message FDRW71, when asking a TSO user whether an ARCHIVED data set should be recalled, so as to require a positive action (keying in ‘YES’ instead of just pressing ‘Enter’) to cause an ARCHIVED data set to be recalled. This option has no effect if options LXDFREST and LXUNCAT are both set to NO, or if option LXFOREST is set to NO.

**YES** — specifies that the message will be:

FDRW71 TYPE 'YES' TO PERMIT THE RESTORE OR PRESS 'ENTER' TO BYPASS

With FDRZAPOP, specify ZAP ENABLE=LXALTMSG.

**NO** — specifies that the message will be:

FDRW71 TYPE 'END' TO BYPASS THE RESTORE OR PRESS 'ENTER' TO CONTINUE With  
FDRZAPOP, specify ZAP DISABLE=LXALTMSG.

The default is NO.

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## 52.24 CONTINUED . . .

**LXRECDEL** For systems at levels lower than DFP Version 3, specifies whether an ARCHIVED data set will be recalled if the CATALOG LOCATE exit can determine that the data set is being referenced by the IDCAMS DELETE command or the TSO DELETE command.

**YES** — specifies that the CATALOG LOCATE exit will recall the data set to be deleted. With FDRZAPOP, specify ZAP ENABLE=LXRECDEL.

**NO** — specifies that the CATALOG LOCATE exit will not recall the data set to be deleted. Instead, the CATALOG LOCATE exit will uncatalog the data set, give a 'not cataloged' return code to LOCATE, and issue message FDRW57. The DELETE will give return code 8, but the data set is effectively deleted. With FDRZAPOP, specify ZAP DISABLE=LXRECDEL.

The default is YES.

For systems at levels of DFP Version 3 or higher, the LXRECDEL option is ignored, and the data set is not recalled. The DELETE command will issue the message IDC0896I MIGRATED ENTRY dsname DELETED, and will give return code 0.

The LXRECDEL option, or the automatic support for the DELETE command under DFP Version 3, does not affect data sets that are deleted under ISPF option 3.4 or under ISMF. In those cases, the CATALOG LOCATE exit is not able to tell, at the time of the first LOCATE, that the data set is going to be deleted.

**LXUNCAT** Specifies whether the CATALOG LOCATE exit will offer a TSO user the choice of uncataloging the data set instead of recalling it, when the exit finds that the user has referenced a data set that is ARCHIVED for recall. If option LXFOREST is set to NO, then option LXUNCAT will be ignored, and the TSO user will not be offered the choice of uncataloging the data set.

**YES** — specifies that the CATALOG LOCATE exit will offer the choice of uncataloging the data set. If the TSO user chooses to uncatalog, then the data set will no longer be eligible for automatic recall by the CATALOG LOCATE exit.

With FDRZAPOP, specify ZAP ENABLE=LXUNCAT.

**NO** — specifies that the CATALOG LOCATE exit will not offer the choice of uncataloging the data set. With FDRZAPOP, specify ZAP DISABLE=LXUNCAT.

The default is NO.

**LXSPFMIG** Specifies whether data set listings displayed under ISPF option 3.4 should show the volume serial as MIGRAT if the data set has been ARCHIVED, even if MIGRAT is not actually the volume serial in the catalog. For installations that do not use the MIGRAT option, the LXSPFMIG option may help users under ISPF option 3.4 to determine which of their data sets have been ARCHIVED.

**YES** — specifies that if the CATALOG LOCATE exit determines that a LOCATE for an ARCHIVED data set was issued by ISPF option 3.4, and it is a type of LOCATE that does not request a recall (i.e. just a catalog listing), then the CATALOG LOCATE exit will return MIGRAT as the volume serial. With FDRZAPOP, specify ZAP ENABLE=LXSPFMIG.

**NO** — specifies that for any LOCATE that does not request a recall, the CATALOG LOCATE exit will return the actual volume serial from the catalog (which reflects the volume from which the data set was ARCHIVED, unless the MIGRAT option was in effect when the data set was ARCHIVED). ISPF option 3.4 will not be handled specially. With FDRZAPOP, specify ZAP DISABLE=LXSPFMIG.

The default is NO.

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## 52.24 CONTINUED . . .

**LXMAXSTC** Specifies the maximum number of started tasks for recall that the CATALOG LOCATE exit will allow to be running in the system at one time. The number may be from 1 to 255. If LXMAXSTC and LXMAXREC are both specified, then LXMAXSTC must be less than or equal to LXMAXREC. With FDRZAPOP, specify ZAP LXMAXSTC=nnn.

If the limit is reached, then:

- If a batch job is requesting the recall, the CATALOG LOCATE exit will issue a message to the console operator, and will go into a wait for one minute at a time, until the number of started tasks for recall falls below the limit. The console operator can cancel the job while it is waiting.
- If a TSO user is requesting the recall, the CATALOG LOCATE exit will issue a message to the TSO terminal, asking the user whether he wants to wait, or to terminate the current operation and perhaps try again later. If the TSO user chooses to wait, then the CATALOG LOCATE exit will go into a wait for one minute at a time, until the number of started tasks for recall falls below the limit. The TSO user can use the Attention (PA1) key to terminate the wait if he changes his mind.

The default is that there is no limit on the number of started tasks for recall that the CATALOG LOCATE exit will allow to be running in the system at one time.

**LXMAXREC** Specifies the maximum total number of recalls that the CATALOG LOCATE exit will allow to be running in the system at one time. This is the sum of recalls done by started tasks (which may be limited separately by the LXMAXSTC option) and recalls performed in the address space issuing the LOCATE. (Remote queue recalls do not count.) The number may be from 1 to 255. If LXMAXSTC and LXMAXREC are both specified, then LXMAXSTC must be less than or equal to LXMAXREC. With FDRZAPOP, specify ZAP LXMAXREC=nnn.

If the limit is reached, then the operation is the same as described for LXMAXSTC.

The default is that there is no limit on the total number of recalls that the CATALOG LOCATE exit will allow to be running in the system at one time.

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## 52.24 CONTINUED . . .

**OUTPUT  
VOLUME FOR  
RECALL**

Whenever the CATALOG LOCATE exit initiates a restore for an ARCHIVED data set, using any restore type, the CATALOG LOCATE exit designates an output volume to which the data set should be restored. The default is that the designated volume is the volume to which the data set is cataloged (which is either the volume from which the data set was ARCHIVED, or 'MIGRAT' if the MIGRAT option was in effect when the data set was ARCHIVED). The following paragraphs explain the interaction among the various options that may change the designated volume. These options are LXCONUSE, LXCONVOL, LXCHKSEC, LXEXIT, LXNEWVOL, and LXREISSU.

Note that the volume that the CATALOG LOCATE exit designates as the output volume for the restore is not necessarily the volume to which the data set will actually be restored. If the designated volume is 'MIGRAT', ABR will substitute the original volume from which the data set was ARCHIVED, as recorded in the ARCHIVE control file. If the designated volume (or the original volume, if the designated volume was 'MIGRAT') is not mounted, or is full, ABR will use the RESTORE Allocation Control List ([Section 91.05](#)), if any, to select a different volume. LXCONUSE and LXCONVOL, in particular, are often used to designate a non-existent volume in order to force ABR to select a volume using the RESTORE Allocation Control List. Also, if SMS is active, SMS may assign the data set to a different volume ([Section 52.50](#)).

To designate the output volume for the restore, the CATALOG LOCATE exit starts by setting a default of the volume to which the data set is cataloged (which is either the volume from which the data set was ARCHIVED, or 'MIGRAT' if the MIGRAT option was in effect when the data set was ARCHIVED).

Then, if the LXCONUSE option is set to YES, the CATALOG LOCATE exit designates the volume specified by the LXCONVOL option as the output volume for the restore.

Next, if the LXEXIT option is set to YES, the CATALOG LOCATE exit calls the exit named by the LXEXIT ... EXIT NAME option. The LXEXIT exit may designate a new volume as the output volume for the restore, as discussed in the [Section 52.25](#) "Security Considerations".

After that, if the LXCHKSEC and SECEXIT options are both set to YES, the CATALOG LOCATE exit calls the Data Set Security exit, using the name specified by the SECEXIT ... EXIT NAME option. The Data Set Security exit may designate a new volume as the output volume for the restore, as discussed in the [Section 52.25](#) "Security Considerations".

Later, if the ARCHIVED data set was requested by a TSO user, and the LXNEWVOL option is set to YES, the CATALOG LOCATE exit issues messages FDRW76 and FDRW77, telling the TSO user the volume that is currently designated as the output volume for the restore, and allowing the TSO user to designate a new volume.

Finally, if the ARCHIVED data set was requested by a TSO user, and the LXNEWVOL option is set to YES, and the TSO user designated a new volume, and the LXREISSU option is also set to YES, the CATALOG LOCATE exit reissues messages FDRW76 and FDRW77, re- displaying the new volume that the TSO user has designated, and allowing the user to change the designated volume again.

Note that it would be very unusual to have all of the above options set to YES at the same installation. For example, if an installation uses an LXEXIT exit or a Data Set Security exit (LXCHKSEC and SECEXIT options) to designate the output volume for the restore, that installation would probably want to set the LXNEWVOL option to NO so that the TSO user could not override the designated volume.

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**52.24A HSM COMPATIBILITY AND COEXISTENCE**

ABR auto-recall is designed to be compatible with DFHSM (the IBM HSM product) and DFSMSHsm (the HSM component of the IBM DFSMS/MVS product). Also, if both ABR and DFHSM or DFSMSHsm are installed on a system, ABR will coexist with HSM, with each product performing recalls for only the data sets which have been ARCHIVED/migrated by it.

**HSM  
COMPATI-  
BILITY**

If the ABR option MIGRAT=YES is used for ARCHIVES, then data sets ARCHIVED for recall will be recataloged to a volser of MIGRAT, just as HSM does, as well as having the normal ABR ARCHIVE indicators in the catalog entry. The ABR LOCATE EXIT will properly recall data sets cataloged to MIGRAT in most cases, but some software products test for a volser of MIGRAT and issue a direct HSM request for the recall (the HRECALL command, or the HSM ARCHRCAL macro, or the HSM SVC); such products include:

DB2  
NFSS (Network File System Server)  
JES2 V4 (for ARCHIVED JCLLIBs (user proclibs) )

and possibly others.

ABR provides two modules to handle these requests:

- \* FDR00024, a front-end to the HSM SVC, which tests for data sets ARCHIVED by ABR and invokes ABR to recall them; other requests are passed to HSM if it is active.
- \* FDRGIVER, an alternative to the ARCGIVER module which is an HSM module invoked by the ARCHRCAL macro and other HSM macros. FDRGIVER handles only recall and delete requests.

If the ABR LOCATE EXIT is being dynamically installed ([as described in Sections 92.5x](#)), ABR will also dynamically install the HSM SVC front-end, FDR00024. If there is no other module called ARCGIVER in the system, ABR will also install FDRGIVER in place of ARCGIVER. With these modules in place, ARCHIVED data sets will be recalled even for programs which issue direct HSM requests.

These modules also handle HSM delete requests (e.g., the HDELETE command) for ABR archived data sets by uncataloging them.

Other HSM requests (to migrate, restore, etc.) will be passed to HSM.

**HSM  
COEXISTENCE**

The HSM SVC front-end, plus code in the ABR LOCATE EXIT, allows ABR to coexist with DFHSM or DFSMSHsm with both ABR and HSM active, even when the ABR MIGRATE=YES option is used (so that both HSM and ABR catalog ARCHIVED and migrated data sets to volser MIGRAT).

The HSM version of ARCGIVER will be used. The SVC front-end will identify which system ARCHIVED a given data set and pass the recall or delete request to ABR or HSM.

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**52.25 ABR AUTOMATIC RECALL — SECURITY CONSIDERATIONS**

**GENERAL** Most installations consider that if a user has sufficient authorization under the data security system to access a data set when it is on disk, then the user should be able to recall the data set if it is ARCHIVED. However, the recall process requires ALTER authority in order to allocate space for the data set being recalled. In most cases, difficulties can be avoided by activating the LXCHKSEC and LXBYPSEC options. The LXCHKSEC option will cause the CATALOG LOCATE exit itself to perform security checking before initiating the restore, and the LXBYPSEC option will cause security checking to be bypassed during the restore.

When the CATALOG LOCATE exit checks security via RACROUTE/RACHECK, the requested access authority is READ (except that if the LXCONUSE/LXCONVOL option or the LXEXIT exit or the Data Set Security exit has designated a new output volume for the restore, then the requested access authority is ALTER). Therefore, the user will usually be able to recall any data set for which he has READ authority. This does not present a security exposure even if the user is trying to write to the data set, because after the data set is recalled, OPEN will still perform the normal security checks. At worst, some disk space will be wasted by recalling a data set that the user will not be able to access, until the data set becomes eligible to be ARCHIVED again.

The LXBYPSEC option specifies that the CATALOG LOCATE exit will cause security checking to be bypassed when it invokes FDRABRUT to add the restore request to the remote queue, or when it invokes FDRABR to perform the restore either within the address space issuing the LOCATE, or by a synchronous external restore or asynchronous external restore; and that the Data Set Not Found exit will cause security checking to be bypassed when it invokes FDRABR to perform the restore. Thus the LXBYPSEC option applies to all restores for automatic recall, except for the job that performs remote queue restores. The installation should run the remote queue restore job under a userid that is exempt from security checking (e.g. RACF OPERATIONS attribute). Security checking for remote queue restores normally is done by the remote queue utility FDRABRUT at the time the request is added to the remote queue. For automatic recalls, if the check by FDRABRUT is suppressed by the LXBYPSEC option, then the LXCHKSEC option can be used to cause the CATALOG LOCATE exit itself to perform security checking before calling FDRABRUT to place the request onto the remote queue.

**LXCHKSEC** If the LXCHKSEC option is set to YES, the CATALOG LOCATE exit itself performs security checking, as follows: If the SECEXIT option is set to YES (Section 91.10), the CATALOG LOCATE exit calls the Data Set Security exit; and/or if the ALLCALL or RACF option is set to YES (Section 91.06), the CATALOG LOCATE exit checks security via RACROUTE/RACHECK. The following paragraphs give further details.

**LXCHKSEC — DATA SET SECURITY EXIT** If both the LXCHKSEC and SECEXIT options are set to YES, the CATALOG LOCATE exit calls the Data Set Security exit, using the name specified by the SECEXIT ... EXIT NAME option, and passing the parameter list detailed in Section 91.11. Field EXLSTYPE contains 'A' indicating FDRABR, field EXLSMODE contains 'W' indicating the CATALOG LOCATE exit, and field EXLSOPT contains 'D' or 'C' indicating data set restore or ICF VSAM cluster restore, respectively. Field EXLSDDN contains binary zeroes. Field EXLSVOLR indicates the volume that is currently designated as the output volume for the restore. If this is the volume to which the data set is cataloged (which is either the volume from which the data set was ARCHIVED, or 'MIGRAT' if the MIGRAT option was in effect when the data set was ARCHIVED), then field EXLSVOLO contains binary zeroes; if the LXCONUSE/LXCONVOL options or the LXEXIT exit have designated a different output volume for the restore, then field EXLSVOLO indicates the volume to which the data is cataloged. Field EXLSDSN contains the data set name or ICF VSAM cluster name to be recalled; the rest of the DSCB is not available and is set to binary zeroes. Fields EXLSLDSN, EXLSLNDN, and EXLSNDSN do not apply and are set to binary zeroes.

If desired, the Data Set Security exit may use the re-entrant address pointer, field EXLSRENT, to store an address pointer for use on subsequent calls to the exit, as described in Section 91.11. This might be useful under step initiation, which is the only environment in which the CATALOG LOCATE exit will call the Data Set Security exit more than once in succession.

The Data Set Security exit must set the completion code in field EXLSCOMP, as follows:

'A' — Accept the operation and allow the data set to be recalled, unless it is rejected by RACROUTE/RACHECK checking.

'X' — Accept the operation and allow the data set to be recalled. Bypass RACROUTE/RACHECK checking for this data set, even if the ALLCALL or RACF option is set to YES.

'R' or 'T' - Reject this data set; do not recall it.

Note that the CATALOG LOCATE exit handles code 'T' exactly the same as code 'R'; this is an exception to the specifications in Section 91.11. Under the CATALOG LOCATE exit, code 'T' does not cause an ABEND, and does not affect the handling of other data sets that may be recalled in the same jobstep.

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**52.25 CONTINUED . . .**

In addition to checking security, the Data Set Security exit, when called by the CATALOG LOCATE exit, may designate a new volume as the output volume for the restore, by returning the new volume serial in field EXLSVOLR of the exit parameter list. If so, and if field EXLSVOLO was previously zeroes, the Data Set Security exit must first copy the original volume serial from field EXLSVOLR to field EXLSVOLO.

The topic “Output Volume for Recall” at the end of the preceding Section on “Installation Options” discusses the interaction among the various options that may change the volume that is designated as the output volume for the restore.

**LXCHKSEC —  
RACROUTE/  
RACHECK**

If the LXCHKSEC option is set to YES and either the ALLCALL or RACF option is also set to YES, the CATALOG LOCATE exit checks security via RACROUTE/RACHECK. The CATALOG LOCATE exit never checks for a volume profile (CLASS='DASDVOL'). The CATALOG LOCATE exit issues RACROUTE/RACHECK for each data set that is requested to be recalled. If, at the time the RACROUTE/RACHECK is issued, the volume that is designated as the output volume for the restore is the same as the volume to which the data set is cataloged (which is either the volume from which the data set was ARCHIVED, or 'MIGRAT' if the MIGRAT option was in effect when the data set was ARCHIVED), then the requested access authority is READ. If not, the CATALOG LOCATE exit issues RACROUTE/RACHECK against the new volume with a requested access authority of ALTER, and also issues RACROUTE/RACHECK against the original volume with a requested access authority of READ. If a profile exists for the new volume, the CATALOG LOCATE exit will require that a profile exist for the original volume also. (Checking against different volume serials is significant only if the data set is protected by a discrete profile; if the data set is protected by a generic profile, RACF ignores the volume serial.)

Note that the requested access authority will be ALTER if a new volume is designated as the output volume for the restore by the LXCONUSE/LXCONVOL option or the LXEXIT exit or the Data Set Security exit, but not if a new volume is designated by a TSO user under the LXNEWVOL option, because the prompting of the TSO user comes after the security checks.

When issuing RACROUTE/RACHECK under ROSCOE, the CATALOG LOCATE exit passes the ACEE of the ROSCOE user who requested the data set, so that security checking will be done against the authorization of that individual user.

**LXEXIT**

If the LXEXIT option is set to YES, the CATALOG LOCATE exit calls a special security exit, using the name specified by the LXEXIT ... EXIT NAME option. If the LXCHKSEC and SECEXIT options are also set to YES, the CATALOG LOCATE exit also calls the regular Data Set Security exit; in that case the LXEXIT exit is called first.

In most respects the LXEXIT exit has the same characteristics and capabilities as the Data Set Security exit, except that the only program that invokes the LXEXIT exit is the CATALOG LOCATE exit. General considerations for the Data Set Security exit are in Section 91.10, the parameter list format is in Section 91.11, and special considerations for running under the CATALOG LOCATE exit are discussed above under “LXCHKSEC — Data Set Security Exit”.

If the LXEXIT exit returns a completion code of 'X' in field EXLSCOMP, then all security checking associated with the LXCHKSEC option will be bypassed, including both the regular Data Set Security exit, and RACROUTE/RACHECK checking.

Why would an installation want to use an LXEXIT exit? One reason is if the installation wants an exit to do special security checking under the CATALOG LOCATE exit, or to designate the output volume for the restore, and does not need a Data Set Security exit to be taken under all programs in the FDR system. In this case option LXEXIT would be set to YES and option SECEXIT would be set to NO.

Another reason is if the installation already has a Data Set Security exit (for example, the FDRYPASS module supplied with ACF2), and wants code in an exit to do additional special security checking under the CATALOG LOCATE exit, or to designate the output volume for the restore. In this case the installation could modify the existing Data Set Security exit so that if field EXLSMODE field in the exit parameter list contains a 'W', indicating a call from the CATALOG LOCATE exit, then the exit does the additional checking, or designates the output volume for the restore; or, the installation could write a separate LXEXIT module. With the latter approach, both options LXEXIT and SECEXIT would be set to YES.

## 52.50 SYSTEM MANAGED STORAGE (SMS)

MVS includes an optional function called System Managed Storage (SMS). If implemented, System Managed Storage provides centralized and automatic assignment of new data sets to specific disk volumes, and the assignment of characteristics to those data sets will enable them to be automatically managed.

IBM also includes functions for the support of SMS in their DASD management software: DSS (known as DFDSS or DFSMSdss) and HSM (known as DFHSM or DFSMShsm).

**The FDR/ABR system includes the SMS functions of DSS and HSM, making those IBM products unnecessary when FDR/ABR is installed.**

## SMS OVERVIEW

This brief summary of System Managed Storage and definition of SMS terms is provided to make it easier for those not familiar with SMS to understand this section. More details on SMS are provided by many IBM manuals and education courses which discuss and document it.

SMS provides several significant enhancements over normal data management:

- \* automatic allocation of new data sets on disk volumes selected by centralized rules
- \* automatic assignment of management characteristics, so that DASD management systems (such as ABR) can make decisions about the management of data sets at the data set level (rather than at the volume or data set group level).

**SMS classes** are the mechanism by which SMS makes its decisions about allocation and management. The available class names, and their meanings, are assigned by the storage administrator. When creating new data sets, the classes to be associated with it can be requested by the user (through JCL and IDCAMS parameters), or classes can be assigned through defaults provided by RACF, or by routines coded by the storage administrator.

**Data Class** allows common characteristics to be assigned to data sets without having to be re-specified. For example, all JCL data sets might be assigned to a data class CNTL which specifies RECFM=FB,LRECL=80,DSORG=PO and other characteristics. Data Classes are used only during the creation of new data sets.

**Management Class** defines how the data set is to be managed by the inactive data manager (ABR or DFHSM). It includes things like backup frequency and days to retain inactive data sets before archiving. Without SMS, these must be specified by control statements in ABR itself, and usually apply to many data sets. The management class allows the inactive data management to be controlled separately by data set.

**Storage Class** is used to influence the decision by SMS of what disk volume a data set is to be allocated onto, and can be used to request special types of volumes (such as cache storage, or dual copy). If a data set has a storage class assigned, it will be allocated onto a SMS-managed disk volume. If no storage class is assigned, the data set will be allocated by the old techniques onto a non-SMS volume.

**Storage Group** consists of one or more SMS-managed disk volumes. Every SMS disk volume belongs to exactly one storage group. A specific storage group cannot be requested by the user, but if a data set has a storage class assigned, a SMS routine will assign one or more storage groups. SMS will then select one volume from among the volumes in those storage groups.

**ACS (Automatic Class Selection) Routines** are coded by the SMS storage administrator at each installation. There are ACS routines for the data class, management class, storage class, and storage group. In each ACS routine, decisions are made about the class to be assigned to each new data set based on many factors (including its name, size, and characteristics, the jobname/userid of the creator, TSO or BATCH, new allocation or restore, etc.). If the user requested specific classes, they are input to the appropriate ACS routine, but the routines can override the user's request. When a data set is being restored from backup, the original classes associated with the data set are passed to the ACS routines (unless overridden by the user).

The SMS classes assigned to a data set (but not the storage group) are stored in both the catalog entry for the data set, and in the SYS1.VVDS.Vvolser on the volume involved. The VVDS was originally for ICF VSAM data sets only, containing VVRs (VSAM volume records), but on SMS-managed volumes, it also contains NVRs (Non-VSAM Records).

SMS has been enhanced since its introduction to support various special types of data sets, including:

- PDSE – PDS Extended
- HFS – Hierarchical File System, used with Open Edition/MVS
- EF – Extended Format data sets, which includes striped sequential, compressed sequential, compressed VSAM KSDSs, and VSAM KSDSs over 4GB in size.

These data set formats may only be allocated on SMS-managed volumes.

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## 52.50 CONTINUED . . .

**FULL-VOLUME OPERATIONS** FDR and ABR full-volume dumps and restores (TYPE=FDR) and COMPAKTOR operations support SMS volumes. During full-volume dumps, SMS class information from VVRs and NVRs is recorded in control records at the beginning of the backup data set (along with DSCBs and other VVDS information).

During full-volume restores and COMPAKTions, checks are made to ensure that volumes that were SMS-managed when they were dumped can only be restored to current SMS-managed volumes on a system with SMS active, and that non-SMS backups can only be restored to non-SMS volumes. Since SMS data sets must be cataloged, SMS volumes cannot be restored to new volume serials, since that would create uncataloged versions of the data sets on the volume, so CPYVOLID=YES is forced for the restore or COMPAKTion of a SMS-managed volume.

However, since the volume being restored may have changed since the backup was taken, some of the data sets on the volume may not be cataloged or may be cataloged to another volume. Neither FDR, ABR, or COMPAKTOR make any attempt to ensure that the data sets being restored are properly cataloged. Since all data sets on a SMS volume must have entries in the VVDS (either VVRs or NVRs), the IDCAMS command DIAGNOSE can compare the VVDS to the catalog and identify any data sets which are improperly cataloged. The IDCAMS command DELETE NOSCRATCH can be used to delete inaccurate catalog entries, and DEFINE RECATALOG may be used to rebuild accurate catalog entries, including the SMS class information, for both VSAM and non-VSAM data sets.

Under special circumstances, it may be necessary to circumvent these rules. For example, you may need to restore SMS volumes under a non-SMS system for disaster recovery. The keyword SMSPROT=NONE bypasses the SMS checks described above.

**SMS VOLUME CONVERSION** When implementing SMS, there are two ways of converting data sets to SMS management. A volume can be converted in place, or data sets can be moved from non-SMS volumes to SMS-managed volumes.

IBM literature refers to the CONVERTV function of DSS as the mechanism for converting a volume in place to SMS-management. **The FDR system program FDRCONVT performs the same function, making DSS unnecessary.** FDRCONVT can convert a volume by invoking the SMS ACS routines to assign storage and management classes to every data set on a volume. It can also convert a volume back to non-SMS. [See Section 52.80](#) for complete details.

DSS CONVERTV **must not** be used on a volume initialized for ABR since it will incorrectly modify the ABR model: **use FDRCONVT.**

FDRCOPY MOVE ([described in Section 21](#)) or FDRDSF DUMP and RESTORE ([Section 20](#)) can be used to move data sets from non-SMS volumes to SMS-managed volumes (assigning storage and management classes) or back to non-SMS, using the techniques described below.

Usually, moving data sets to SMS volumes with FDRCOPY is preferable to using FDRCONVT, if spare DASD volumes are available. Converting volumes requires that an entire volume be converted at one time and that any problems which would prevent conversion (such as uncataloged data sets or ineligible data set types) be resolved. If the volumes being converted contain parts of multi-volume data sets, then all of the other volumes on which those data sets reside must also be converted. A FDRCOPY MOVE allows groups of data sets to be converted in a less drastic manner, and allows for an easier fall-back to non-SMS.

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## 52.50 CONTINUED . . .

**DATA SET  
OPERATIONS**

Data set operations in the FDR system include DSF dumps and restores, FDRCOPY copies and moves, ABR incremental backups, ABR archive backups, and ABR incremental and archive data set restores.

All data set dumps are unchanged under SMS except that SMS class information from VVRs and NVRs are recorded in control records at the beginning of the backup data set (along with DSCBs and other VVDS information), and ABR operations can optionally use SMS management class attributes for data set selection.

However, data set restores (including the output side of FDRCOPY operations) are significantly changed on a system with SMS active.

On all systems, SMS or not, an output volume will be chosen. Complete rules are documented in [Section 20](#) (DSF), [Section 21](#) (FDRCOPY), [Section 50](#) (backup restore) and [Section 51](#) (archive restore). Briefly, this volume may be the volume to which the data set is currently cataloged, the original volume from which it was dumped, a volume specified by a DD statement or by an NVOL= parameter specified by the user (or by the ABR RESTORE ALLOCATION LIST). If the data set is found in the VTOC of that volume, the restore/copy/move will be done to that pre-allocated data set and SMS will not be involved.

However, if the data set is NOT found in that volume's VTOC, and SMS is active on the system, SMS will be invoked to decide where the data set should be allocated.

First, the SMS storage class ACS routine will be invoked to determine if the data set should be SMS-managed. A storage class name may be passed to the ACS routine if:

- \* the STORCLAS= operand was specified by the user, that value will be passed.
- \* the NULLSTORCLAS operand was specified by the user, a null storage class will be passed.
- \* the data set being restored or copied/moved was SMS-managed, and neither operand was given, the original storage class of the data set will be passed.

The storage class ACS routine may honor the storage class passed in, or may choose to override it with a different class or a null class. If a storage class is returned, the data set will be SMS-managed. If a null class is returned, the data set will be non-SMS, and the restore or copy/move will attempt to allocate it on the volume previously selected. If the volume selected is a SMS-managed volume, but no storage class was assigned, the allocation will fail.

If a storage class was assigned, the SMS management class ACS routine will be invoked. A management class name may be passed to the ACS routine if:

- \* the MGMTCLAS= operand was specified by the user, that value will be passed.
- \* the NULLMGMTCLAS operand was specified by the user, a null management class will be passed.
- \* the data set being restored or copied/moved was SMS-managed, and neither operand was given, the original management class of the data set will be passed.

The management class ACS routine may honor the management class passed in, or may choose to override it with a different class or a null class (which implies that a SMS default class will be used).

The SMS data class ACS routine will not be invoked. Data classes are used only during the allocation of totally new data sets. For data sets being restored or copied/moved, all of the data set characteristics implied by data classes have already been determined. However, the data class is retained in the catalog and VVR/NVR for documentation purposes. The data class of a SMS data set created by the FDR system can be specified by the DATACLAS= or NULLDATACLAS operands, or the original data class will be used during the allocation if the input data set was SMS-managed.

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## 52.50 CONTINUED . . .

**DATA SET  
OPERATIONS  
(Continued)**

An authorized storage administrator can bypass the invocation of the class ACS routines by specifying the BYPASSACS operand, in order to control directly the classes assigned. In this case, the SMS classes assigned will be those specified by the STORCLAS=, MGMTCLAS=, and/or DATACLAS= operands, or the original classes associated with the data set if not overridden. A storage class must be assigned if the data set is to be SMS-managed.

The SMS storage group ACS routine will now be invoked, to determine on which SMS storage group(s) this data set should be allocated, using the SMS storage class as input. SMS will then build a list of SMS-managed disk volumes in the selected storage group(s) and attempt allocation on each volume in that list until it is successful (or fails on each). When the FDR system invokes the SMS allocation, "like" devices (the same type of disk as the data set being restored or copied/moved) will be selected first, if there are any in the group(s) selected, since like device restore is much more efficient than "unlike" device restore. If allocation cannot be done on a "like" device, SMS will be instructed to look for an "unlike" device.

An authorized storage administrator can bypass the invocation of the storage group ACS routine by specifying the BYPASSSMS operand, in order to directly control the volume on which the data set will be placed. FDR will attempt to allocate the data set directly on the output volume it has chosen (or the user has specified). If the output volume is SMS, a storage class must be assigned to the data set.

Once SMS allocates the data set, its contents will be restored, along with appropriate DSCB and VVR/NVR data ([See Section 52.04 for details](#)). However, the SMS classes in the data set on disk will not be disturbed (either the classes assigned in the steps just described, or the classes associated with a pre-allocated SMS data set). If a SMS-managed data set is being restored to a non-SMS volume, there will, of course, be no classes associated with it.

**GUARANTEED  
SPACE  
STORAGE  
CLASS**

An SMS storage class assigned to a data set may have an attribute of "guaranteed space" which has two functions:

- 1) it allows a user to specify the volume serials of the SMS volumes that the data set is to be placed on;
- 2) even if specific volume serials are not specified, for multi-volume data sets it pre-allocates the primary space on EVERY volume assigned.

However, when FDR allocates an SMS data set, it usually passes a specific volume serial, the serial of the target output volume chosen by FDR (as described earlier in this section). If the data set has a guaranteed space storage class, SMS will try to honor the volume chosen by FDR, rather than choosing a volume by SMS rules. The storage group ACS routine will still be invoked, but if the volume chosen by FDR is not in one of the assigned storage groups, or if the allocation fails on that volume, SMS will not be able to allocate the data set.

So, even if the guaranteed space data set was originally allocated on non-specific SMS volumes, FDR will always try to allocate it to a specific volume. At best this circumvents SMS management of data set placement, and at worst, the data set cannot be restored.

The circumvention is to specify NVOL=volser on the SELECT statement, where "volser" is a volume serial that does not exist on your system (e.g., NVOL=DUMMY). In this case, FDR will NOT pass a volser to SMS, and SMS will be free to choose an output volume. For an ABR restore, there must not be an ALLOCATE statement that applies to the data set.

Because of this limitation, INNOVATION recommends that use of guaranteed space storage classes be limited to data sets that truly need them.

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## 52.50 CONTINUED . . .

**ABR SUPPORT** ABR can be run against SMS-managed volumes, as well as non-SMS volumes, even in the same ABR step.

ABR supports those attributes of the SMS management class and storage group which apply to the ABR architecture. However, the SMS attributes were designed by IBM to support the architecture of DFHSM; since ABR has a different architecture, some of those attributes do not apply to ABR and are not used. For example, ABR manages retention of backups on a volume level, based on the number of generations or retention assigned for that volume, so the attributes relating to retention of backups are not used. A complete list of the SMS attributes NOT used by ABR appears later in this section.

**ABR VOLUME SELECTION** The SMS-managed volumes to be included in an ABR backup or archive step can be specified by the normal ABR volume selection (DISKxxxx DD statements, the ONLINE or ONLVOL operands, or MOUNT statements), or all the volumes defined to a SMS storage group can be included using a MOUNT statement with the STORGRP= operand. For example,

```
MOUNT STORGRP=PROddb
MOUNT STORGRP=TSO
```

will include all SMS volumes defined in those two storage groups. Both SMS and non-SMS volumes may be selected in the same ABR step.

Regardless of how the SMS-managed volume was selected, it must be properly initialized for ABR processing. The FDRABRM utility ([Section 55](#)) or the ABR ISPF dialog (option A.I.8) must be used to place an ABR Model DSCB in the VTOC of the SMS-managed volume. On SMS volumes, the ABR model will be a cataloged data set so the catalog to which the ABR high-level index is assigned (normally "FDRABR") *must* be an ICF catalog. A storage class must be assigned to the ABR model but will not be used for volume selection since ABR must force the model to the designated volume being initialized; management and data classes are not used for ABR models.

In addition, ABR will use the SMS storage group of a SMS-managed volume (no matter how it was selected) to determine eligibility for ABR processing. The storage group definition includes flags which indicate if the volumes in the group are eligible for "Auto Migrate", "Auto Backup" and/or "Auto Dump" . The definition also includes system names and dump classes which are not used by ABR.

For backup processing, the SMS volume must have an ABR model **and** its storage group must indicate that it is enabled for "Auto Backup" and "Auto Dump" . If it is enabled for only "Auto Dump" without "Auto Backup" then the volume will be processed only for explicit full-volume backups (DUMP TYPE=FDR) and will be bypassed for other ABR backup operations.

For ARCHIVE and SUPERSCRATCH processing, the ABR model must indicate that it is enabled for ARCHIVE or SUPERSCRATCH (as appropriate) **and** the storage group must indicate that it is enabled for "Auto Migrate" .

Since the options in the ABR model essentially duplicate those in the SMS storage group, you can bypass the checks on the storage group and use only the ABR options for eligibility checking by coding the operand SMSCONSTRUCT=NO on the DUMP statement.

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## 52.50 CONTINUED . . .

**ABR  
MANAGE-  
MENT CLASS  
USAGE**

By default, ABR will *not* use management class attributes of SMS-managed data sets for data set selection and processing; data sets will be selected by normal ABR options and operands as described in [Sections 52.02](#) and [52.03](#). If you desire, you can run your normal ABR jobs against SMS volumes and select datasets by normal ABR rules, without using SMS management classes at all.

If the operand SMSMANAGE=YES is specified on the DUMP statement, then ABR will use management class attributes for the selection of data sets from SMS volumes while still using normal selection on non-SMS volumes. If you plan to process SMS and non-SMS volumes in the same ABR step, you may need to specify ABR selection operands for the non-SMS volumes (they will be ignored for SMS volumes with the exceptions noted in the following text).

During ABR processing of SMS volumes, ABR will read the definitions of all management classes into storage. As each data set is read from the VTOC of the SMS volume, its associated management class name will be determined and that name will be looked up in the table. Data sets with no management class will be managed according to the default management class associated with the SMS configuration (if there is no default management class, data sets with no management class will not be processed, nor will data sets with invalid (not currently defined) classes).

Normally, ABR will examine all SMS datasets on the selected SMS volumes and make decisions based on their management classes. However, you may wish to limit ABR to processing only datasets with specified management classes in a particular ABR step. For example, you may wish to limit an ARCHIVE step to selecting only management classes which will retain ARCHIVED datasets for a certain period such as 30 days. As long as SMSMANAGE=YES is specified, you can do so by specifying the management class names on the DUMP statement with the MGMTCLAS= operand (one or more class names can be given); datasets that do not have one of the specified management class names will be bypassed, and datasets that do match will go through the selection process described in this section.

Note that SUPERSCRATCH and ARCHIVE are still two separate operations within ABR, requiring two ABR steps if both functions are desired. Since some management class attributes relate to scratching of expired data sets, and some to ARCHIVING (migration) of data sets, you may wish to run SUPERSCRATCH on SMS-volumes before running ARCHIVE on the same volumes to avoid ARCHIVING data sets unnecessarily.

The following sections detail the use of management class attributes during the three types of ABR operations (backup, SUPERSCRATCH and ARCHIVE).

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## 52.50 CONTINUED . . .

**ABR BACKUP** For full-volume and incremental ABR backups, if SMSMANAGE=YES, the management class is used only to exclude certain datasets from incremental backups. Management class attributes are NOT used to manage retention of datasets in full and incremental backups.

SMS management class attributes will have no effect on ABR full-volume backups (DUMP TYPE=FDR or full-volume dumps forced during DUMP TYPE=ABR/AUTO/DSF). As usual, all data sets will be dumped during a full-volume backup.

For TYPE=DSF backups, the data sets selected by SELECT/EXCLUDE statements will be dumped unless their management class attribute "ADMIN OR USER COMMAND BACKUP" is set to NONE, which effectively protects the data set from data set backups.

For TYPE=ABR or TYPE=AUTO backups, data sets will be selected by the normal ABR rules ([See Section 52.02](#)) or by SELECT/EXCLUDE statements, but they will not be dumped if the management class attribute "ADMIN OR USER COMMAND BACKUP" is set to NONE or if the attribute "AUTO BACKUP" is set to NO.

Some attributes of the SMS storage group and management class are designed for use by IBM's HSM products and have no meaning for the ABR system since its architecture is considerably different. In particular, the attributes relating to retention of backups are not used; retention of ABR backups follow the normal ABR rules documented elsewhere. The attributes are listed below relate to backup processing, but will be ignored when ABR is used to manage SMS volumes.

Management Class attributes

- BACKUP FREQUENCY
- NUMBER OF BACKUP VERSIONS (DATA SET EXISTS)
- NUMBER OF BACKUP VERSIONS (DATA SET DELETED)
- RETAIN DAYS ONLY BACKUP VERSION (DATA SET DELETED)
- RETAIN DAYS EXTRA BACKUP VERSIONS

Storage Group attributes

- MIGRATE SYSTEM NAME
- BACKUP SYSTEM NAME
- DUMP SYSTEM NAME
- DUMP CLASS
- GUARANTEED BACKUP FREQUENCY

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## 52.50 CONTINUED . . .

**ABR SUPER-  
SCRATCH** SUPERSCRATCH (DUMP TYPE=SCR) scratches data sets which are not needed, for which no backup is required. When SMSMANAGE=YES is specified on the DUMP statement, then on SMS volumes SUPERSCRATCH will scratch data sets which are "expired" according to management class rules:

If you specify the EXPIRED operand on the DUMP TYPE=SCR statement, then SUPERSCRATCH will scratch data sets that have reached their expiration date. Data sets will have an expiration date recorded in their Format 1 DSCB if the creator of the data set specified an expiration date (EXPDT=yyddd) or retention period (RETPD=dddd) or if the associated SMS data class specified an expiration/retention. If the expiration date in the DSCB is non-zero, and is less than or equal to today's date, the data set is considered expired and will be scratched if EXPIRED was specified.

If EXPIRED is not specified, then data sets with non-zero expiration dates will not be scratched (with the exception of rolled-off GDGs as described below).

For SMS data sets which have zero for the DSCB expiration date (not specified), then the management class attributes "EXPIRE AFTER DAYS NON-USAGE" and "EXPIRE AFTER DAYS/DATE" will be used to determine if the data set should be scratched (the EXPIRED operand is not required):

- \* If "EXPIRE AFTER DAYS NON-USAGE" is set to a value, the data set may be scratched if it is "nnn" days since the date it was last referenced (stored in the Format 1 DSCB). This is equivalent to the ABR operand ADAYS=nnn.
- \* If "EXPIRE AFTER DAYS/DATE" is set to a days value, it may be scratched if it is "nnn" days since the data set was created (also stored in the Format 1 DSCB). This is equivalent to the ABR operand CRDAYS=nnn.
- \* If "EXPIRE AFTER DAYS/DATE" is set to a Julian date, it may be scratched if that date is less than or equal to today's date. This has no ABR equivalent.
- \* If both of these attributes are set to NOLIMIT then data sets with zero expiration dates will not be scratched. If one of them is set to NOLIMIT then only the other test will be done, but if both of them are set to values, then **both** of the tests must be satisfied for the data set to be scratched.

If the data set is a GDG generation that is in ROLLED-OFF status (fallen off the GDG limit but not deleted from disk because the GDG does not have the SCRATCH attribute or the generation was not expired), the management class attribute "ROLLED-OFF GDS ACTION" will control additional tests:

- \* If "ROLLED-OFF GDS ACTION" is blank or MIGRATE, the above rules will be used to determine if it should be scratched. If it is not scratched, MIGRATE will cause it to be ARCHIVED during a subsequent TYPE=ARC run.
- \* If "ROLLED-OFF GDS ACTION" is EXPIRE, the generation will be scratched unless its expiration date in the Format 1 DSCB is greater than today's date. No other tests will be done.

On SMS volumes when SMSMANAGE=YES is specified, *only* the preceding rules will be used to select data sets for scratching; SELECT/EXCLUDE statements and any GENERAL ARCHIVE SELECTION CRITERIA will *not* be used, and SCREXCL statements (the SCRATCH PROTECT LIST) will *not* protect SMS-managed data sets. If you need to scratch data sets based on other criteria, or need to use SELECT/EXCLUDE, you will need to make a separate TYPE=SCR run with SMSMANAGE=NO. However, temporary data sets will be selected by a SELECT TEMP statement even if SMSMANAGE=NO.

You can select or exclude volumes for SUPERSCRATCH processing based on allocation thresholds, as described in the following section on *VOLUME THRESHOLD PROCESSING* but it is not recommended. SUPERSCRATCH takes very little time, so there is little reason to bypass volumes simply because their allocation percentage is low.

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**ABR ARCHIVE** ARCHIVE (DUMP TYPE=ARC) moves inactive data sets to less expensive media such as tape or compressed disk. In SMS and HSM terms, this is known as MIGRATION, but it is the same thing.

There is one significant difference between ABR ARCHIVING and HSM migration. HSM only tracks one copy of a migrated data set; normally migrated data sets move first to ML1 (compressed disk) and later to ML2 (tape). ABR has the ability to create and track two backup copies of an ARCHIVED data set (which may be one on compressed disk and one on tape) at the same time.

If SMSMANAGE=NO is specified or defaulted on the DUMP statement, then ABR will treat SMS volumes like non-SMS volumes. Management class attributes will not apply, and all of the normal ABR ARCHIVE selection detailed in [Section 52.03](#) will apply.

If SMSMANAGE=YES is specified, then during TYPE=ARC processing of SMS volumes ABR will check the "COMMAND OR AUTO MIGRATE" attribute of the management class of each data set:

- \* If it is set to BOTH then the last reference date in the Format 1 DSCB of the data set is tested to see if the data set has been used in the interval specified by "PRIMARY DAYS NON-USAGE. If not, it will be archived; if so, ABR will test for SMSCOMMAND=YES as described below.
- \* If it is set to COMMAND, and SMSCOMMAND=YES was specified on the DUMP statement, then the data set will be passed through the normal ABR SELECT/EXCLUDE statements (if any) to see if it should be selected based on normal ARCHIVE selection process as detailed in [Section 52.03](#) (except that if there is no SELECT/EXCLUDE which matches it, it will not be tested against the GENERAL ARCHIVE SELECTION CRITERIA (if any) on the DUMP statement). If SMSCOMMAND=NO (the default), the data set is excluded from archiving.
- \* If it is set to NONE, the data set is excluded from archiving (similar to the ABR archive protect list).

So, when ARCHIVING, if SMSCOMMAND=NO is specified or defaulted, data sets will be selected from SMS volumes based only on the management class criteria, while non-SMS volumes will be processed by normal ABR control statement options. Therefore, SMS and non-SMS volumes can be easily processed in one ABR run. If SMSCOMMAND=YES you can have SELECT/EXCLUDE (and PROFILE/PROTECT) statements which will apply to SMS volumes as well as non-SMS volumes; however, EXCLUDE statements and PROTECT statements (the ARCHIVE PROTECT LIST) will *not* prevent a data set from being selected from a SMS volume by management class criteria.

If a data set is a rolled-off GDG generation, and "ROLLED-OFF GDS ACTION" is set to MIGRATE, it will be ARCHIVED. For *all* GDG generations, if "# GDG ELEMENTS ON PRIMARY" is not blank, then any generation which is not within the most recent "n" generations will be ARCHIVED (just like the ABR MAXGDG= operand). Other GDG generations may also be archived if they meet the tests above.

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**ARCHIVE  
EXPIRATION**

As datasets are ARCHIVED, they are recorded in the Archive Control File; the location of their COPY1 backup and their COPY2 backup (if created) are recorded, as well as the expiration date of each copy. On non-SMS volumes, the expiration date of COPY1 and COPY2 is set from values specified in the TAPEX and TAPEXX DD statements (or the DUMP statement) and the expiration will be the same for all datasets ARCHIVED in the same ABR step. By default, the same is true for SMS datasets. These expirations are referred to as the "normal ABR expirations" in this discussion.

However, if you specify SMSEXPIRE=YES (or SMSEXPIRE=PRT) as well as SMSMANAGE=YES on the DUMP TYPE=ARC statement, then ABR will set the expiration of COPY1 and COPY2 individually for each SMS dataset based on attributes of its associated SMS management class. Most of the following discussion assumes that you are creating a COPY1 on disk and a COPY2 on tape in one ABR step when ARCHIVING datasets from SMS volumes. If this is not true, see the notes later in this subsection.

The intent of the following rules is to set the COPY1 disk expiration of every dataset so it can be recalled from disk for the period that the management class specifies it should be on "LEVEL 1", and so that it reaches its final expiration according to other management class attributes.

The COPY1 expiration will be calculated from the attribute "LEVEL 1 DAYS NON-USAGE" plus the Last Reference Date stored in the Format 1 DSCB of the dataset. If the calculated expiration date is already past, the expiration is set to today's date. If "LEVEL 1 DAYS NON-USAGE" is set to "NOLIMIT", the COPY1 expiration is set to the normal ABR COPY1 expiration.

If the dataset has an explicit expiration date in its Format 1 DSCB (if the creator of the dataset specified a expiration date (EXPDT=yyddd) or retention period (RETPD=dddd) or if the associated SMS data class specified an expiration/retention), then that date will be used for the COPY2 expiration.

If it does not have an explicit expiration, the COPY2 expiration will be the higher of:

- the attribute "EXPIRE AFTER DAYS NON-USAGE" plus the Last Reference Date stored in the Format 1 DSCB of the dataset.
- the attribute "EXPIRE AFTER DAYS/DATE" (if it specifies a date, that date is used; if it specifies a days value, that value plus the Creation Date stored in the Format 1 DSCB is used).

If either of these attributes has a value of NOLIMIT, then it is not used. If both are NOLIMIT, then the expiration is set to the normal ABR COPY2 expiration.

There is a minimum COPY2 retention, to avoid the situation where the calculated retention results in a dataset expiring almost immediately. It can be specified on the DUMP statement by the SMSMINRET= operand and defaults to 30 days. If the calculated COPY2 expiration is less than the minimum, it is set to the minimum.

If the calculated COPY1 expiration is higher than the COPY2 expiration, it is set to the COPY2 expiration. Also, if COPY1 is on tape, it is set to the COPY2 expiration.

If you are creating a COPY1 on disk and no COPY2, the COPY2 expiration is still stored in the Archive Control File for later use by FDRTSEL as noted below. If COPY1 is on tape, it will receive the COPY2 ("level 2") expiration; the "LEVEL 1" expiration will *only* be used for backups on disk.

Even when SMSEXPIRE=YES is used, the normal ABR expiration dates for COPY1 and COPY2 will still be placed in the labels of the ARCHIVE backup datasets created on disk and tape, so the backup datasets may be retained until those dates are reached.

For this reason, you may wish to divide your SMS ARCHIVE into several jobs or steps, using the MGMTCLAS= operand on the DUMP statement to restrict processing to datasets with management classes whose expirations will be within the normal ABR expirations assigned to the COPY1 and COPY2 backups. For example, for a step whose JCL specifies RETPD=10 on COPY1 and RETPD=60 on COPY2, select those management classes whose LEVEL 1 retention is no more than 10, and whose final expiration is no more than 60 days.

Another option would be to use tape management catalog control (usually specified by EXPDT=99000) on the COPY2 on tape; the FDRARCH REORG utility will uncatalog the tape when all files in it have expired, so that it will automatically be released when there are no longer any active datasets stored on it.

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**ARCHIVE  
EXPIRATION  
(Continued)**

The usage of SMSEXPIRE can be very confusing, so here is an example to help clarify it. In this example, the COPY1 backup on disk will be created with a normal ABR retention period of 30 days, and the COPY2 on tape will be scratched by tape management when all files on it are uncataloged (catalog control). However, the expiration dates of COPY1 and COPY2 for the individual datasets will be set in the Archive Control File according to their specified management classes.

SMSEXPIRE=PRT is the same as SMSEXPIRE=YES except that a list of the SMS-managed datasets and the expirations assigned to them will be printed (SMSEXPIRE=PRT is useful with SIM (simulate) to verify correct operation of the management classes).

```
//ABRSMS EXEC PGM=FDRABR, REGI ON=2M
//SYSPRI NT DD SYSOUT=*
//SYSPRI N1 DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//TAPE1 DD DSN=FDRABR. POOLDI SK. ABR1, UNI T=DI SK, DI SP=OLD,
// VOL=SER=( POOLO1, POOLO2), LABEL=RETPD=30
//TAPE11 DD DSN=ABR11, UNI T=CART, VOL=( , , 255), DI SP=(, KEEP),
// LABEL=EXPDT=99000
DUMP TYPE=ARC, SMSMANAGE=YES, SMSEXPI RE=PRT, SMSMI NRET=5,
RECALL=YES, DYNARC, DSNENQ=USE, COMPRESS=ALL
MOUNT STORGRP=USER
```

If the job is run on date 96.100, the COPY1 backup dataset will expire on 96.130. If the SMS configuration contains management classes with these names and attributes:

```
DEFAULT (assigned as the default management class in the SMS configuration)
    PRIMARY DAYS NON-USAGE=15 EXPIRE AFTER DAYS NON-USAGE=60
    LEVEL 1 DAYS NON-USAGE=30 EXPIRE AFTER DAYS/DATE=NOLIMIT
MANAGE01
    PRIMARY DAYS NON-USAGE=8 EXPIRE AFTER DAYS NON-USAGE=35
    LEVEL 1 DAYS NON-USAGE=25 EXPIRE AFTER DAYS/DATE=50
MANAGE02
    PRIMARY DAYS NON-USAGE=5 EXPIRE AFTER DAYS NON-USAGE=30
    LEVEL 1 DAYS NON-USAGE=15 EXPIRE AFTER DAYS/DATE=NOLIMIT
```

then here are some examples of individual datasets that will be selected for archive based on PRIMARY DAYS NON-USAGE and the actual expiration dates that will be recorded for them:

```
Dsn=A Crdate=96.040 Expdate=none Lastref=96.080 Mgmtclas=none
uses default management class DEFAULT
COPY1 expires 96.110 (Lastref + LEVEL 1 DAYS NON-USAGE)
COPY2 expires 96.140 (Lastref + EXPIRE AFTER DAYS NON-USAGE)
Dsn=B Crdate=96.084 Expdate=none Lastref=96.084 Mgmtclas=MANAGE01
COPY1 expires 96.109 (Lastref + LEVEL 1 DAYS NON-USAGE)
COPY2 expires 96.134 (Crdate + EXPIRE AFTER DAYS/DATE) *
* results in a higher value than (Lastref + EXPIRE AFTER DAYS NON-USAGE)
Dsn=C Crdate=96.084 Expdate=96.140 Lastref=96.090 Mgmtclas=MANAGE01
COPY1 expires 96.115 (Lastref + LEVEL 1 DAYS NON-USAGE)
COPY2 expires 96.140 (Expdate)
Dsn=D Crdate=96.090 Expdate=none Lastref=96.095 Mgmtclas=MANAGE02
COPY1 expires 96.110 (Lastref + LEVEL 1 DAYS NON-USAGE)
COPY2 expires 96.125 (Lastref + EXPIRE AFTER DAYS NON-USAGE)
Dsn=E Crdate=96.090 Expdate=96.107 Lastref=96.093 Mgmtclas=MANAGE02
COPY1 expires 96.108 (Lastref + LEVEL 1 DAYS NON-USAGE) **
COPY2 expires 96.107 (Expdate)
** COPY1 expiration changed to 96.107 because it exceeds COPY2
Dsn=F Crdate=96.080 Expdate=96.102 Lastref=96.086 Mgmtclas=MANAGE02
COPY1 expires 96.101 (Lastref + LEVEL 1 DAYS NON-USAGE)
COPY2 expires 96.105 (SMSMINRET)
```

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## 52.50 CONTINUED . . .

**ARCHIVE  
EXPIRATION  
(Continued)**

The FDRTSEL utility ([See Section 10.15](#)) has several features to help manage archive backups taken with SMSEXPIRE=YES:

- Since the archives within a given backup file will have varying expiration dates, the ARCEDIT function can be used periodically to copy archive tapes and discard the data sets which have expired, reducing the size of the tape library.
- If you create COPY1 disk and later copy it to tape with FDRTSEL, it will optionally automatically assign the COPY2 expiration (the final "level 2" expiration) calculated above. This is true even if no COPY2 was created at backup time.

Also, the FDRARCH utility ([See Section 55](#)) has been enhanced to support this. If you run a REORGanization of the Archive Control File with the ENABLE=SMSEXPIRE option specified, it will scratch a COPY1 backup on disk if all the entries that point to it are expired, even if the COPY2 entries are not yet expired. This allows REORG to automatically clean up the backup files on disk when they are no longer required, even if the normal ABR expiration for that backup is not yet reached.

**VOLUME  
THRESHOLD  
PROCESSING**

If the THRESHOLD= operand is specified on the DUMP TYPE=ARC statement, the percentage of space allocated on a SMS volume will be compared to the high-allocation threshold in the SMS storage group associated with the volume (THRESHOLD=HIGH), or the low-allocation threshold (THRESHOLD=LOW) or a user-specified value (THRESHOLD=nn). If the allocation percentage is below the threshold, then ARCHIVING will be bypassed on the volume during this ABR step. This allows you to bypass ARCHIVING on volumes with sufficient free space.

Thresholding is also supported on non-SMS volumes but the high and low thresholds are stored in the ABR model on those volumes. On SMS volumes, the thresholds in the ABR model can be used instead of those in the storage group if the operand SMSTHRESHOLD=NO is specified.

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## 52.50 CONTINUED . . .

**ACS ROUTINE  
VARIABLES**

When the SMS ACS (Automatic Class Selection) routines are invoked for allocation of a data set on a system with SMS active, various read-only variables are available to those routines, for use in deciding what classes (if any) to assign to the data set. These variables and their values are fully described in IBM Storage Administration manuals in the chapter on "ACS Language Reference".

The following are brief descriptions of the variables and their values when SMS is invoked by FDRDSF, FDRCOPY, or FDRABR when restoring or copying/moving a data set. Some of the values are set by FDR itself, and some (such as RACF values) are set by SMS before the ACS routine gets control.

ACS variables for ALL data set allocations by FDR

&ACSENVIR – environment in which the allocation is being done:

'RECALL' – for any restore from ARCHIVE (including auto-recall)

'RECOVER' – for all other data set restores

'ALLOC' – for FDRCOPY copy/move

'CONVERT' – for FDRCONVT (SMS conversion in-place)

&ANYVOL/&ALLVOL – the target volume chosen by FDR for the data set allocation. For FDRCONVT, the volume(s) the data set currently resides on.

&APPLIC – RACF application identifier

&DEF\_DATACLAS – RACF default data class

&DEF\_MGMTCLAS – RACF default management class

&DEF\_STORCLAS – RACF default storage class

&DSN – data set name being allocated or converted

&DSNTYPE – data set name type ('HFS', 'LIBRARY' (PDSE), 'PDS', null)

&DSORG – data set organization ('PS', 'PO', 'VS', 'DA', null)

&DSOWNER – RACF data set owner

&DSTYPE – data set type ('GDS', 'PERM', 'TEMP', null)

&EXPDT – expiration date (yyyyddd)

&HLQ – high-level qualifier of the data set name

&LLQ – low-level qualifier of the data set name

&MAXSIZE – maximum size of data set in KB or MB

&NQUAL – number of qualifiers in the data set name

&NVOL – number of volsers (always 1, except for FDRCONVT).

&RECORG – for VSAM, cluster organization ('KS', 'ES', 'RR', 'LS')

&RETPD – retention period

&SIZE – primary allocation size of data set in KB or MB

&UNIT – unit type (e.g., '3390') for the FDR-selected target volume

ACS variables ONLY available for FDRCOPY copy/move

&ACCT\_JOB – accounting information from the JOB statement.

&ACCT\_STEP – accounting information from the EXEC statement.

&GROUP – RACF group name

&JOB – JOB name, TASK name, or TSO userid

&PGM – job step program name (usually 'FDRCOPY')

&USER – userid of the person running FDRCOPY.

&XMODE – execution mode ('BATCH', 'TSO', 'TASK')

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**52.51 SMS QUESTIONS AND ANSWERS**

The objective of this section is to answer some of the most common questions asked about the FDR products in an SMS system.

**Q: HOW DO I RESTORE SMS VOLUMES AT A DISASTER RECOVERY SITE?**

**A:** At a disaster recovery site, you may need to restore SMS-managed volumes on a starter system that does not have SMS active, or which does not include your volumes in its SMS configuration. In this case, you can tell FDR or FDRABR to restore SMS volumes to non-SMS output disks by adding the SMSPROT=NONE keyword to the RESTORE statement; this tells FDR not to make its usual checks when restoring SMS volumes.

Of course, the volumes will be restored with all of their SMS indicators intact, assuming that you will eventually IPL a system with your normal SMS configuration. At that time the restored volumes will be usable. Until the IPL is done, the data on the volumes can be accessed, but no datasets can be allocated or scratched.

**Q: HOW DO I CONVERT A VOLUME TO BE SMS-MANAGED?**

**A:** INNOVATION's recommendation is to convert datasets to SMS management by moving them to SMS-managed volumes using FDRCOPY or FDRDSF DUMP/RESTORE, rather than converting the volumes in-place, whenever possible. Moving the datasets allows SMS to position them on the proper SMS volumes according to the SMS classes assigned; datasets not eligible for SMS will be left on their original volumes and can be handled separately.

Program FDRCONVT, documented in [Section 52.80](#), can be used to convert a volume to SMS-managed (and back) in place, without data movement.

The CONVERTV function of IBM's DSS can also be used to do such a in-place conversion. However, **CONVERTV cannot be used on a volume that has been initialized for ABR**. CONVERTV will improperly modify the ABR model DSCB ("FDRABR.Vvolser"). FDRCONVT must be used on an ABR volume.

**Q: CAN I USE A FULL-VOLUME RESTORE/COPY TO CONVERT SMS VOLUME TO NON-SMS?**

**A:** No, a full-volume restore or copy (via FDR, ABR, or CPK) always restores all of the SMS indicators in the VTOC and VVDS, so it cannot be used to convert a volume. Normally a full-volume operation requires that an SMS-managed volume be restored/copied to a volume currently defined to SMS (and a non-SMS volume only to non-SMS).

**Q: HOW DOES SAR HANDLE SMS VOLUMES?**

**A:** SAR (Stand-Alone Restore) is totally unaware of the SMS or non-SMS status of volumes. Since SAR is normally a full-volume dump and restore, it will dump and restore all SMS indicators on the volume; SAR will restore the volume in its original state (SMS or not). When the operating system is reIPLed, SMS volumes will be recognized by SMS if they are currently defined in an SMS storage group. Unlike FDR, SAR does not check the SMS status of the output volume so it will restore to an SMS or non-SMS volume.

**Q: ARE THERE CONSIDERATIONS FOR ARCHIVING FROM SMS VOLUMES?**

**A:** The use of the ABR option MIGRAT=YES is strongly recommended when ARCHIVING datasets from SMS-managed volumes. MIGRAT=YES places a volser of MIGRAT in the catalog entries of ARCHIVED datasets instead of the data set's original volume serial number. Since SMS datasets normally have an NVR in the VVDS of their original volume, many MVS functions which operate on the catalog entries of ARCHIVED datasets (such as LISTCAT and GDG processing) will get errors if they try to process an ARCHIVED dataset and discover that the NVR is missing. However, those functions recognize the volser of MIGRAT to mean that the dataset is ARCHIVED and do not try to access the NVR.

MIGRAT=YES can be specified on the DUMP TYPE=ARC statement of appropriate ABR jobs. However, MIGRAT=YES can also be set as a permanent option in the ABR option table (using FDRZAPOP or the ABR ISPF panel A.I.4.4) so that it will be automatically used for all ARCHIVE jobs. You may want to use MIGRAT=YES for all ARCHIVING, SMS or not.

As of V5.2 Level 30, MIGRAT=YES can and should be used even if DFHSM or DFSMSHsm is installed on your system.

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## 52.51 CONTINUED . . .

**Q: HOW DO I MOVE AN SMS-MANAGED VOLUME WITH FDR?**

**A:** Occasionally you may want to move an entire SMS volume to a new disk, for performance balancing or because of problems with an HDA. This can easily be done with FDR full-volume copy, or full-volume dump and restore, but there are a few considerations for SMS.

First, you may want to be sure that the volume is not in use when you dump or copy it. For a non-SMS volume IBM has never provided any good mechanism to do so, but on SMS volumes you can change the volume to disabled status which will not allow any new jobs to allocate it. This is done by the following console command:

```
V SMS, VOL(vol ser), DI SABLE
```

This will not affect any jobsteps currently using the volume (unless they try to scratch datasets) but will fail any new jobsteps trying to access datasets on the volume. Unfortunately, DISABLE status also prevents FDR from accessing the volume to dump or copy, so you will need to change the status back to ENABLE just before the FDR step starts and back to DISABLE as soon as the dump/copy begins.

If the SMS volume is shared by more than one CPU or LPAR, you should vary the device offline to every system except the one on which the move is to be done.

Now, you can either do a full-volume COPY or a full-volume DUMP and RESTORE to move the volume. In either case, the output volume may be either an SMS-managed volume (with a different volser) or a non-SMS volume. It must, of course, be the same device type with an equal or larger capacity. If it is a larger capacity, you must rebuild the indexed VTOC with ICKDSF BUILDIX.

An example of a COPY job is:

```
//FDRCOPY      EXEC    PGM=FDR
//SYSPRI NT     DD      SYSOUT=*
//SYSPRI N1     DD      SYSOUT=*
//DI SK1        DD      UNI T=DI SK, VOL=SER=vvvvv1, DI SP=OLD          <== INPUT VOLUME
//TAPE1         DD      UNI T=DI SK, VOL=SER=vvvvv2, DI SP=OLD          <== OUTPUT VOLUME
//TAPE11        DD      DSN=backup. vvvvv1, UNI T=TAPE,                <== TAPE BACKUP
//              VOL=( , , , 99), DI SP=( , CATLG)                      <== RECOMMENDED
              COPY TYPE=FDR, CPYVOLI D=YES, DSNENQ=HAVE
```

If the output volume is currently non-SMS, add ",SMSPROT=NONE" to the COPY statement. After the COPY, the output volume will be renamed to the input volser and placed offline. At this point you issue these console commands:

```
V cuu, OFFLINE                                     <=== original SMS volume address
M cuu, VOL=(SL, vvvvv1)                             <=== output volume address
```

and the volume will again be usable by SMS (if you DISABLEd the volume to SMS you must now ENABLE it).

An example of a DUMP and RESTORE is:

```
//FDRDUMP      EXEC    PGM=FDR
//SYSPRI NT     DD      SYSOUT=*
//DI SK1        DD      UNI T=DI SK, VOL=SER=vvvvv1, DI SP=OLD          <== INPUT VOLUME
//TAPE1         DD      DSN=backup. vvvvv1, UNI T=TAPE,                <== TAPE BACKUP
//              VOL=( , , , 99), DI SP=( , CATLG)
              DUMP TYPE=FDR, DSNENQ=HAVE
```

... at this point vary the input disk volume offline ...

```
//FDRREST      EXEC    PGM=FDR
//SYSPRI NT     DD      SYSOUT=*
//DI SK1        DD      UNI T=DI SK, VOL=SER=vvvvv2, DI SP=OLD          <== OUTPUT VOLUME
//TAPE1         DD      DSN=backup. vvvvv1, DI SP=OLD
              RESTORE TYPE=FDR, CPYVOLI D=YES
```

If the output volume is currently non-SMS, add ",SMSPROT=NONE" to the RESTORE statement. After the RESTORE, the output volume will be renamed to the input volser, but SMS will not yet know about it. You must issue these console commands:

```
V cuu, OFFLINE                                     <=== output volume address
M cuu, VOL=(SL, vvvvv1)                             <=== output volume address
```

and the volume will again be usable by SMS (if you DISABLEd the volume to SMS you must now ENABLE it).

If the original volume was damaged or has hardware problems so that it cannot be dumped or copied, you can do an FDR or ABR full-volume recovery to a new disk volume, and issue the VARY and MOUNT shown above to reactivate the volume. In this case, other steps may be required to put the back-leveled volume in sync with the system catalogs as described on page 758.

CONTINUED . . .

## 52.51 CONTINUED . . .

**Q: HOW DO I IMPLEMENT SMS MANAGEMENT CLASSES IN ABR?**

**A:** ABR supports selection and management of datasets based on SMS management class attributes. [Section 52.50](#) gives much detail on the operation of ABR when management classes are used, but it is a complicated topic. The discussion below attempts to simplify it.

Actually, implementation of management classes in ABR is not difficult. There is a keyword, SMSMANAGE=YES which can be placed on any ABR DUMP statement; it tells ABR to use SMS management classes whenever an SMS volume is being processed, but it is ignored for non-SMS volumes. If you have existing ABR jobstreams which process SMS volumes, you may be able to implement management class selection with minimal modifications.

The description of ABR's processing of management classes in [Section 52.50](#) is detailed, but in simple terms, SMSMANAGE=YES turns on ABR support for all of the attributes of management classes which relate to actual selection of datasets from disk for backup, SUPERSCRATCH, and ARCHIVE (such as "PRIMARY DAYS NON-USAGE" and "ROLLED OFF GDG ACTION"); they will be used by ABR just as they are described in ISMF and in the IBM storage administration manuals.

For ABR backups (not ARCHIVES), SMS management class support can be used ONLY to exclude certain datasets from backup; ABR does not use the attributes which relate to the retention of backups.

In SUPERSCRATCH and ARCHIVE, the management class attributes which relate to expiration and migration of datasets are supported.

SUPERSCRATCH (DUMP TYPE=SCR) supports the attributes which relate to "expiration" of datasets. Datasets which are considered expired under the management class rules will be scratched from SMS volumes by a SUPERSCRATCH step which specifies SMSMANAGE=YES (expired datasets which actually have an expiration date in their Format 1 DSCB in the VTOC will be scratched from SMS volumes ONLY if the "EXPIRED" keyword is also specified on the DUMP TYPE=SCR statement).

ARCHIVE (DUMP TYPE=ARC) supports the attributes which relate to selection of datasets for "migration" (such as "PRIMARY DAYS NON USAGE").

In an ARCHIVE step, you may optionally add the operand SMSEXPIRE=YES, which enables ABR support to set the COPY1 and COPY2 expiration dates in the Archive Control File separately for every dataset selected for ARCHIVE by SMSMANAGE=YES processing, based on the management class attributes "LEVEL 1 DAYS NON-USAGE", "EXPIRE AFTER DAYS NON-USAGE" and "EXPIRE AFTER DAYS/DATE". ABR will then consider the COPY1 (Level 1) and COPY2 (Level 2) backups to be expired according to their individual management classes.

So, if you have existing ABR ARCHIVE jobs which process SMS volumes, you can add management class support simply by adding SMSMANAGE=YES (and optionally SMSEXPIRE=YES) to the DUMP statement; ABR will do management class testing on SMS volumes and use normal ABR ARCHIVE keywords for selection on non-SMS volumes. If you are not already running SUPERSCRATCH on your SMS volumes, you will need to add a new ABR step preceding the ARCHIVE step, with DUMP TYPE=SCR, SMSMANAGE=YES to scratch expired datasets (the volumes must also be enabled for SUPERSCRATCH in the ABR model).

You may want to separate the processing of SMS volumes from non-SMS volumes. The MOUNT STORGRP= statement can be used to select SMS volumes by storage group name (SMSMANAGE=YES is still required on the DUMP statement). When processing SMS volumes you may also wish to limit processing only to datasets with certain management class names; you can do this by specifying the MGMTCLAS= operand on the DUMP statement.

One last note: ABR ARCHIVE offers some selection criteria not supported by the management class (such as IFNOTCAT). Of course you can always ARCHIVE based on ABR keywords on an SMS volume just by running a step that does NOT specify SMSMANAGE=YES, but you may want to select by management class AND ABR criteria in one step. In that case, specify SMSCOMMAND=YES on the DUMP TYPE=ARC statement (it is not supported for SUPERSCRATCH); if the management class does not cause a dataset to be selected for ARCHIVE, ABR will check the ABR control statement criteria as well.

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## 52.51 CONTINUED . . .

**Q: WHAT DO I NEED TO DO TO MY ACS ROUTINES FOR FDR?**

**A:** When coding your SMS ACS (Automatic Class Selection) routines you may need to consider a few things relating to FDR; these considerations also apply to DSS and HSM.

During the initial allocation of a dataset, several ACS routine variables can be tested, including the jobname, program name, userid, RACF group and execution mode (BATCH, TSO, or TASK). Your ACS routines may be coded to base class assignments on these variables as well as on other variables such as the dataset name, type of dataset, and its size.

However, during a restore of a dataset that first set of variables will NOT be set; they will be nulls (this is by IBM's rules, not ours). The reason is obviously that during a restore the value of those variables would reflect the job or task doing the restore and not the original owner of the dataset, so they would be meaningless during a restore. If the ACS routines test any of those variables ([See Section 52.50 for a complete list](#)), they should bypass those tests if the &ACSENVIR variable is "RECALL" (for restore from archive) or "RECOVER" (for any other restore).

It is also important to know that during an FDR dataset restore, the original SMS classes of the dataset being restored (if it was SMS managed) will be passed as the initial values of the &STORCLAS, &MGMTCLAS, and &DATACLAS variables (those initial values can be overridden by the user using operands on the SELECT statement for other than an auto-recall restore). For a restore, you may wish to code the ACS routine to accept the initial values in most cases.

For FDRCOPY, the &ACSENVIR variable will be set to "ALLOC" and the other ACS variables will be set as if this was a normal allocation. However, you may still need to code special rules if the &PGM is "FDRCOPY" since the variables will reflect the FDRCOPY step, not the original user.

The Data Class ACS routine will never be invoked for a restore or copy/move. The IBM manual GG24-3403 "Writing ACS Routines" is a useful reference.

**Q: HOW CAN I CONTROL THE SMS CLASSES AND VOLUMES USED?**

**A:** Sometimes you want to restore, copy or move datasets, but you don't want SMS to override the classes of the original datasets, or you want to specify the output volumes to be used. In this case, you can use the operands BYPASSACS and/or BYPASSSMS on the RESTORE or COPY/MOVE statements.

BYPASSACS does not invoke the ACS routines at all. The classes assigned to the dataset can be specified by the user on the SELECT statement (e.g., MGMTCLAS=) or the original classes of an SMS-managed dataset will be used. The output dataset must have a storage class assigned (either the original class or specified by STORCLAS=) to be SMS-managed; conversely, if NULLSTORCLAS is specified the dataset will be allocated unconditionally as non-SMS.

BYPASSSMS bypasses SMS storage group and volume selection, and allocates SMS datasets directly on the output volumes you specify (the volumes MUST be SMS-managed if the dataset has a storage class).

Since these options circumvent normal SMS controls, the use of these operands is restricted by a FACILITY class profile in RACF or equivalent security products. The user must be authorized to the name.

STDADMI N. ADR. RESTORE. BYPASSACS -- for restores

STDADMI N. ADR. COPY. BYPASSACS -- for copy/move

These names should be restricted to authorized storage administrators.

**Q: HOW DO YOU DELETE AN IMPROPERLY CATALOGED SMS DATASET?**

**A:** By IBM's rules, SMS datasets must always be cataloged, and non-VSAM SMS datasets must have an NVR (non-VSAM record) in the VVDS. Occasionally an interrupted dataset creation may leave an SMS dataset only partially created, where the catalog entry, NVR or VVR, and/or DSCB is missing. Such datasets require manual intervention to clean them up since a normal deletion will fail.

To delete the catalog entry for an incomplete dataset, issue the IDCAMS command:

DELETE name NOSCRATCH

The ability to do DELETE NOSCRATCH under SMS may be protected by a security system profile, so it may need to be done by an authorized user.

To delete the NVR and DSCB for an uncataloged SMS dataset, issue the IDCAMS command:

DELETE name NVR FILE(DD1)

where DD1 is a DD statement pointing to the volume involved. DELETE NVR will fail if the dataset is actually cataloged. DELETE NVR will work if only the NVR or only the DSCB exist for the dataset (users with DFP 3.1.0 or DFP 3.1.1 installed must install the fix for IBM APAR OY44034 to delete a DSCB without an NVR).

To delete the VVR and DSCB for uncataloged VSAM components (SMS or not), for EACH component on the volume issue the IDCAMS command:

DELETE name VVR FILE(DD1)

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## 52.51 CONTINUED . . .

**Q: HOW CAN I PREPARE FOR SMS CONVERSION WITH FDREPORT?**

**A:** FDREPORT can be used to identify data sets that are not supported by SMS such as ISAM, non-ICF VSAM, unmovable and uncataloged datasets. The following example shows how to identify these datasets to ease the conversion to SMS; the report also shows the catalog status of each dataset and the volume to which it is cataloged.

```
TITLE LINE=' DATASETS NOT ELIGIBLE FOR SMS ON TSO VOLUMES'
XSELECT DSORG=(U, I S, AM), DSORG. NE. (EF), VOLG=TSO          UNSUPPORTED DSORG
XSELECT CATALOG=ERR, VOLG=TSO                                CATALOGED TO ANOTHER VOL
XSELECT CATALOG=NO, VOLG=TSO                                  UNCATALOGED
REPORT   FI ELD=(DEFAULTS, CATALOG, CATVOL)
PRI NT
```

**NOTE:** A simulation with program FDRCONVT can also be used to identify ineligible datasets by volume. An example is shown in [Section 52.85](#).

**Q: CAN FDREPORT HELP ME MANAGE MY SMS DATASETS?**

**A:** FDREPORT can report and summarize based on SMS classes and select based on SMS storage groups so a variety of reports can be generated on SMS-managed datasets and volumes. The example below selects all SMS-managed datasets (data sets that have an SMS storage class assigned) and sorts by storage class name, reporting all datasets which are assigned to each unique storage class, and summarizing based on storage class giving the total occurrences of each class and the total number of tracks of the datasets with that class. You could also report on management class or data class names by changing the field name in the SORT and SUMMARY statements to MGMTCLAS or DATACLAS.

```
TITLE LINE=' ALL SMS DATASETS BY STORAGE CLASS NAME'
XSELECT STORCLAS. NE. ' '                                     *SEE NOTE 1
SORT     FI ELD=(STORCLAS, DSN), BREAK=(Y, N)                SUMMARIZE ON CLASS NAME
SUMMARY  FI ELD=(STORCLAS, SI ZE)
REPORT   FI ELD=(DEFAULTS, SMSCLASS)
PRI NT   ONLI NE, I NFMSG=NO
```

**NOTE 1:** STORCLAS.NE. will select all datasets whose storage class is not blank (all SMS datasets have a storage class).

**Q: CAN I USE ABR TO IMPLEMENT SMS TAPE MOUNT MANAGEMENT?**

**A:** IBM has a feature for SMS called "Tape Mount Management" (TMM). It's function is to divert small datasets which are currently being written to tape (leaving much wasted tape) to SMS-managed disk volumes. IBM recommends that one or more SMS-managed disk volumes be dedicated to this purpose (known as "DASD Buffer" volumes) in a storage group by themselves. This storage group should be processed by the DASD management system at frequent intervals so that all or most of the datasets that reside there can be migrated directly to tape, resulting in efficient tape utilization since many such datasets will occupy one tape.

Tape Mount Management can be implemented with FDRABR. IBM implemented a new attribute in the SMS storage group definition which tells HSM to process the DASD Buffer volumes every hour regardless of other DFHSM options. Since ABR processing is done by batch ABR jobs scheduled by the user, this attribute is not required.

To implement TMM with ABR:

- 1.) Define a DASD Buffer storage group to SMS. You will probably want to define it with a large high threshold (such as 90 percent) and a moderate low threshold (such as 50 percent).
- 2.) You may need to define several data and management classes to identify and process these datasets. The management classes should specify "PRIMARY DAYS NON USAGE" values of 0 (to allow immediate archiving) or very small values (for datasets which may need to be read back within a day or two).
- 3.) Your ACS routines must be modified to recognize tape datasets which are appropriate for TMM and direct them to the TMM classes and storage group. IBM has a program called "DFP VOLUME MOUNT ANALYZER" which can be requested from your IBM representative to assist in identifying such datasets.
- 4.) A separate ABR job must be coded and scheduled to run against that DASD Buffer storage group at frequent intervals to archive directly to tape (TAPE1 points to a real tape drive). You may want to specify the THRESHOLD=LOW operand in this job so that datasets will be archived from the disk only if the disk is becoming full.



**52.80 FDRCONVT OVERVIEW**

**OVERVIEW** FDRCONVT converts a disk volume to or from SMS management without movement of data. It can be used as an alternative to converting data sets to or from SMS management by backing up and restoring them via FDR or FDRDSF or moving them with FDRCOPY.

FDRCONVT can be used to convert a disk volume to SMS or NONSMS status. The volume is first placed in INITIAL status to prevent new data sets from being allocated while conversion is taking place. All of the data sets on the volume are then converted. If any data set cannot be converted, the volume remains in INITIAL status. Once all of the data sets on the volume have been converted, the volume is placed in SMS or NONSMS status, as specified. Conversion of disk volumes to or from SMS status can be simulated prior to actual conversion if desired.

FDRCONVT can place a disk volume in INITIAL status to prevent new data sets from being allocated to the volume in preparation for converting the volume to SMS management. Volumes can be converted to INITIAL status prior to being assigned to an SMS storage group. In order to convert a volume to SMS status, the volume must be assigned to an SMS storage group.

Special processing, such as specifying SMS storage class or management class, can be performed for selected data sets or for all data sets on the volume during conversion to or from SMS status.

**CONSIDER-  
ATIONS FOR  
IN-PLACE  
CONVERSION**

FDRCONVT converts data sets to SMS management in-place without moving any data. Conversion in-place is usually faster than converting the data sets by moving the data, especially if the volume contains only a few data sets. However, there are several disadvantages to this method of conversion:

Conversion in-place does not allow the storage management subsystem to determine where the data sets are to be placed. It is a user responsibility to insure that the SMS storage and management classes assigned to the data sets being converted in-place are appropriate. For example, you must insure that a storage class with the AVAILABILITY=CONTINUOUS attribute is not assigned to any data sets on disk volumes being converted to SMS which are not dual-copy devices.

Because data sets are not moved by FDRCONVT, conversion of a volume in-place may result in the high or low ALLOCATION/MIGRATION THRESHOLD values defined in the storage group for the volume to be exceeded. If the high THRESHOLD value is exceeded, the system may not allocate any more data sets to the volume, or data sets could be migrated off the volume to meet the THRESHOLD values.

The VVDS must be able to expand sufficiently to accommodate class information for all data sets being converted. Approximately 35 bytes are required for each VSAM component and 139 bytes for each non-VSAM data set. If there are many non-VSAM data sets on a volume, the VVDS may not be able to get enough space or enough secondary extents to convert all of the data sets. In this case, some data sets must be moved off the volume in order to allow the VVDS to expand. Also note that performance may be poor on a volume on which the VVDS is in a large number of extents.

If any data sets on a volume cannot be converted to the desired status (SMS or NONSMS), the volume will remain in INITIAL status. INITIAL status will prevent any new data sets from being allocated on the volume. Also, when converting a volume containing multivolume data sets to NONSMS status, any volumes not specified in the VOL= parameter which contain extents of multivolume data sets will be converted to INITIAL status, since these volumes will contain both SMS and NONSMS data sets.

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## 52.80 CONTINUED. . .

**CONVERSION  
BY DATA  
MOVEMENT**

The FDRABR, FDRCOPY, and FDRDSF programs can also be used to convert data sets to SMS management by moving data to SMS-managed volumes. The target disk volumes should be initialized with ICKDSF using the INIT command and the STORAGEGROUP and INDEX operands. This will create a VTOC and VTOC index of the desired size and place the volumes in SMS status. The SYS1.VVDS data set will automatically be created when the first VSAM or non-VSAM data set is allocated on a volume, or alternatively, a VVDS can be created explicitly before any data sets are allocated. A large enough VVDS should be defined to accommodate all of the data sets that will reside on a volume.

Once the target volumes are in SMS status, FDRCOPY can be used to move data sets from non-SMS-managed volumes to the SMS managed volumes. FDRDSF and FDRABR can also be used to restore data sets from backups of managed or non-managed disk volumes to SMS-managed volumes.

There are several advantages to converting data sets in this manner. Conversion by data movement allows the storage management subsystem ACS routines to determine the volumes on which the data sets can be placed. This insures that volumes with the proper characteristics are chosen and prevents the converted volumes from having so much data placed on them that the ALLOCATION/MIGRATION THRESHOLDS in the storage group definition are exceeded. The VTOC, VTOC index, and VVDS can be placed adjacent to one another, and a large VVDS can be defined either automatically (the default size for the VVDS is now 10 tracks each of primary and secondary space), or explicitly.

**REQUIRE-  
MENTS FOR  
CONVERSION**

In order to convert a disk volume to or from SMS status, the volume must be eligible for conversion. Disk volumes which are not assigned to an SMS storage group or which do not have an active indexed VTOC cannot be converted to SMS status. Volumes may be converted to INITIAL status without being assigned to an SMS storage group, but they must have an active indexed VTOC. If a volume is eligible for conversion, it is placed in INITIAL status before conversion of the data sets on the volume is begun.

In addition to the volume being eligible for conversion, all of the data sets which reside on the volume must also be eligible for conversion. If an ineligible data set is found on a volume being converted, that data set is bypassed and conversion continues with the next data set. If all data sets are eligible, the volume is converted to SMS or NONSMS status as specified. If any ineligible data sets were found, the volume remains in INITIAL status. Ineligible data sets must be deleted or moved off the volume before the volume can be successfully converted.

**PREPARING  
VOLUMES FOR  
CONVERSION  
TO SMS**

It may not be practical to attempt to convert all of the data sets on a volume to SMS management at the same time, particularly if new data sets are continually being allocated to the volume. Prior to assigning a volume to an SMS storage group and converting it to SMS status, it may be necessary to quiesce the volume and prevent allocations of new data sets on it. This can be done by using FDRCONVT to place the volume in INITIAL status. New data sets cannot be allocated to a volume in INITIAL status, although existing data sets can be accessed, extended, or deleted. Existing data sets on an INITIAL volume cannot be extended to another volume.

Once the volume is in INITIAL status, no new allocations can take place on it. Data sets that are not eligible for conversion to SMS management can then be deleted or moved to other volumes so that the remaining data sets on the volume can be converted. In this way, the volume can be converted to SMS management over a period of time, so that data sets on the volume remain accessible to users.

As part of the conversion process, FDRCONVT always places volumes in INITIAL status by updating the status indicators in the format-4 DSCB and the VTOC index prior to converting any data sets on the volume to or from SMS management.

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## 52.80 CONTINUED . . .

**CONVERTING  
DATA SETS  
TO SMS MAN-  
AGEMENT**

In order to convert a volume to SMS management, all of the data sets on the volume must be eligible for conversion. The following types of data sets are NOT eligible for conversion to SMS management:

- Non-ICF VSAM data sets or catalogs
- OS CVOLs and data sets catalogued in OS CVOLs
- ISAM data sets
- SYS1.STGINDEX data sets
- Uncatalogued generation data sets (GDGs)
- Uncatalogued multivolume data sets
- Unmoveable data sets (e.g., data sets with DSORG=PSU or POU)
- BDAM data sets with OPTCD=A
- Active (i.e., ENQueued) data sets
- Data sets for which the ACS routines develop a null STORCLAS

Uncatalogued data sets are not eligible for conversion to SMS management unless the CATLG=YES parameter is specified, which allows the data sets to be catalogued in a standard order of search catalog.

Multivolume data sets are not eligible for conversion unless either all volumes on which the data sets reside are specified in the VOL= parameter or the MULTIVOL=YES parameter is specified.

A data set is converted to SMS management by calling the ACS routines to determine the storage class and management class that should be assigned to the data set. The ACS routines are called by FDRCONVT in the 'CONVERT' environment (i.e., &ACSENVIR= 'CONVERT'). Data sets for which the ACS storage class routine returns a null SMS storage class are not eligible for conversion to SMS. The data class routines are never called. If the SMS storage class returned from the ACS routines is not null and the data set is otherwise eligible, the data set is converted to SMS management by creating or updating its entry in the VVDS and BCS to add SMS class information and then updating an indicator in the data set's format-1 DSCB to indicate that the data set is SMS managed. Once all of the data sets on the volume have been converted to SMS management, the volume status indicators in the format-4 DSCB and the VTOC index are updated to place the volume in SMS status.

If any data sets on the volume could not be converted, the volume is not converted and remains in INITIAL status. After the ineligible data sets are deleted or moved off the volume, FDRCONVT can be run again to convert the volume to SMS status. When converting to SMS status, data sets that are already SMS managed are not processed again unless REDETERMINE=YES is specified.

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## 52.80 CONTINUED . . .

**CONVERTING  
VOLUMES  
OUT OF SMS  
MANAGE-  
MENT**

FDRCONVT can convert SMS-managed volumes or volumes in INITIAL status to NONSMS status. In order to convert a volume out of SMS management, the volume must be eligible for

de-conversion. If the volume is currently in SMS status, it must be assigned to an SMS storage group and must have an indexed VTOC. If the volume is in INITIAL status, it must have an indexed VTOC. In addition, all of the data sets on the volume must be either non-SMS managed already or must be eligible for conversion from SMS management.

PDSEs can reside only on volumes in SMS or INITIAL status. Therefore, volumes containing PDSEs cannot be converted to NONSMS status unless the PDSEs are moved off the volume prior to de-conversion.

Active data sets, i.e., data sets for which a SYSDSN ENQueue fails, cannot be converted out of SMS management.

Eligible data sets are converted out of SMS management by removing the entry in the VVDS for non-VSAM data sets, or by removing the SMS class information from the entry in the VVDS and BCS for VSAM data sets. The ACS routines are not called. Once the VVDS entry for the data set has been updated or deleted, an indicator in the data set's format-1 DSCB is updated to indicate NONSMS status. After all of the data sets on the volume have been converted out of SMS management, the volume state indicators in the format-4 DSCB and the VTOC index are updated to place the volume in NONSMS status.

If any data sets on the volume could not be converted, the volume is not converted and remains in INITIAL status. After the ineligible data sets are deleted or moved off the volume, FDRCONVT can be run again to convert the volume to NONSMS status.

**PROCESSING  
SPECIFIC  
TYPES OF  
DATA SETS****A. UNCATALOGUED DATA SETS AND DATA SETS NOT ALIASED**

Multivolume uncatalogued data sets and uncatalogued generation data sets cannot be converted to SMS management. Single-volume non-VSAM data sets which are uncatalogued or are not catalogued in the catalog to which their high level qualifier(s) is(are) aliased cannot be converted to SMS management unless the CATLG=YES parameter is specified.

If the CATLG=YES parameter is specified, uncatalogued non-VSAM data sets and non-VSAM data sets catalogued outside the standard order of search are catalogued or recatalogued in the appropriate standard order of search catalog (i.e., the catalog to which the data set's high level qualifier(s) is(are) aliased).

The INCAT parameter can be used to specify the catalog to be searched for non-VSAM data sets catalogued outside the standard order of search.

Uncatalogued VSAM data sets, e.g., VSAM data sets which have been DELETED with the IDCAMS NOSCRATCH option, cannot be converted to SMS management.

When converting out of SMS management, the only SMS managed data sets that may be uncatalogued data sets are GDGs and temporary data sets. Any other data sets which have a format-1 DSCB that indicates SMS-managed but are not catalogued are in error and are not deconverted.

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## 52.80 CONTINUED . . .

## B. MULTIVOLUME DATA SETS

Multivolume data sets cannot be converted to or from SMS management unless all of the volumes on which the data sets reside are specified in the VOL= parameter and are therefore being converted, or unless the MULTIVOL=YES parameter is specified. The MULTIVOL=YES parameter indicates that extents of multivolume data sets which are not on volumes specified in the VOL= parameter are to be processed.

For multivolume non-VSAM data sets, the first volume on which the data set resides MUST always be specified in the VOL= parameter in order for the data set to be converted to SMS management. For multivolume VSAM data sets, the FIRST volume on which the base cluster's data or index component or any alternate index cluster's data or index component resides must be specified in the VOL= parameter in order to convert the data set to SMS management. This provision — that the first volume on which the data set or component resides must be in the volume list when converting to SMS management — applies even if MULTIVOL=YES was specified.

All volumes of a multivolume data set are processed at once when any extent of the data set is encountered. If any volume on which an extent of the data set resides is not eligible for conversion, then the entire multivolume data set is ineligible for conversion. All volumes which contain extents of a multivolume data set must be assigned to the same SMS storage group.

If an extent of a multivolume data set resides on a volume not specified in the VOL= parameter, and MULTIVOL=YES is specified, the format-1 DSCB of the data set on that volume is updated to indicate the data set is SMS-managed, even though the volume may not be SMS-managed.

Multivolume non-VSAM data sets whose catalog entries include candidate volumes are recatalogued with the candidate volumes made non-specific when converting to SMS management (i.e., the catalog entries for the candidate volumes are changed to '\* '). When converting multivolume non-VSAM data sets out of SMS management, the candidate volume entries are removed.

When converting to NONSMS status, the first volume on which the data set resides need not be specified in the VOL= parameter, although MULTIVOL=YES must be specified if any extents of multivolume data sets reside on volumes not specified via VOL=. If MULTIVOL=YES is not specified, then multivolume data sets which have extents residing on volumes not specified in the VOL= parameter will still be converted to NONSMS status. However, the volumes which were not specified in the VOL= parameter will be set to INITIAL status, preventing further allocations on those volumes.

## C. VSAM DATA SETS

All parts of an ICF VSAM data set, including alternate indexes, are converted at once when any component of the data set is encountered. All parts of a VSAM data set, including alternate indexes and paths, must be catalogued in the same catalog using an alias in order for the data set to be converted.

CONTINUED . . .

## 52.80 CONTINUED . . .

## D.GENERATION DATA SETS

Uncatalogued generation data sets cannot be converted to SMS management. Catalogued GDGs can only be converted to SMS management if they are catalogued in an ICF catalog. Model DSCBs cannot be converted to SMS management because they are uncatalogued.

When converting to NONSMS status, generations that are not active, (i.e., 'deferred' or 'rolled-off' generations) are uncatalogued.

## E. TEMPORARY DATA SETS

Temporary non-VSAM data sets can be converted to SMS management. The format-1 DSCBs of temporary data sets are marked 'SMS-uncatalogued'.

## F. THE VTOC, VTOC INDEX, AND VVDS

Flags in the format-4 DSCB and the VTOC index indicate the volume state — SMS-managed, INITIAL status, or NONSMS. The VTOC itself is not a data set and therefore cannot be converted to or from SMS management.

A VTOC index is required on all SMS-managed volumes and volumes in INITIAL status. The VTOC index is converted to or from SMS management along with the other data sets on the volume being converted. When converted to SMS management, the format-1 DSCB for the VTOC index is marked 'SMS-uncatalogued'.

A VVDS is required on all SMS managed volumes which are not empty. The VVDS is converted to or from SMS management along with the other data sets on the volume being converted.

**52.81 PROCESSING OPTIONS AND FEATURES**

<b>SIMULATE OPTION</b>	FDRCONVT can simulate conversion of volumes and data sets to or from SMS management. This makes it possible to determine from the output of the job what data sets on a volume cannot be converted to SMS management and what SMS storage and management classes will be assigned to those data sets that are eligible for conversion.
<b>SELECT/ EXCLUDE CRITERIA</b>	FDRCONVT supports SELECT and EXCLUDE statements that can be used to specify special processing for particular data sets or groups of data sets. Data sets specified in EXCLUDE statements are considered ineligible for conversion. SELECT statements can be used to specify the SMS storage class and management class to be passed as input to the ACS routines for particular data sets. Input storage class and management class can also be specified on the CONVERTVOL or SIMULATE control statements to apply to all data sets processed. Note that the storage class or management class specified may be changed by the ACS routines unless BYPASSACS is also specified.
<b>PROCESSING REQUIRE- MENTS</b>	In order to run FDRCONVT, the storage management subsystem must be active and the volumes which are to be processed must be permanently mounted online and accessible. If volumes are to be converted to SMS management, they must be assigned to an SMS storage group in order for the conversion to be successful.
<b>STORAGE REQUIRE- MENTS</b>	The basic storage requirement for FDRCONVT is 1024K (1M) of virtual storage. This figure includes storage for buffers, control statements, working storage, and program storage. A minimum of 128K of virtual storage must be available below the 16M line. The remainder of the storage may be gotten above 16M. More storage may be required if many ICF VSAM data sets are to be processed. The ICFCORE parameter can be used to increase the storage available for processing ICF VSAM clusters.
<b>SECURITY CONSIDER- ATIONS</b>	FDRCONVT checks that the user has RACF FACILITY class authority to the STGADMIN.ADR.CONVERTV resource before beginning conversion of any volumes or data sets. To convert a volume, the user must also have DASDVOL authority to the volume. If the INCAT parameter is used to specify catalogs for data sets catalogued outside the standard order of search, FDRCONVT checks that the user has RACF FACILITY class authority to the STGADMIN.ADR.CONVERTV.INCAT resource. If BYPASSACS is specified, FDRCONVT checks that the user has RACF FACILITY class authority to the STGADMIN.ADR.RESTORE.BYPASSACS resource.

**52.82 FDRCONVT JCL REQUIREMENTS**

**JOB STATEMENT** The JOB statement is user-specified and depends upon installation standards.

**STEPLIB OR JOBLIB DD STATEMENT** If required, specifies the load library in which FDRCONVT resides. The library must be an APF-authorized library.

**EXEC STATEMENT** Specifies the program name (FDRCONVT) and region requirement. The minimum region size required is 1024K. The PARM parameter is optional and may specify a single CONVERTV or SIMULATE control statement.

**SYSPRINT DD STATEMENT** Specifies the output message data set. Normally a SYSOUT data set. This is a required DD statement.

**SYSUDUMP DD STATEMENT** Specifies the abend dump data set. Although not required, this data set should always be included in order to help diagnose error conditions. SYSUDUMP is usually a SYSOUT data set.

**SYSIN DD STATEMENT** Specifies the control statements data set. Usually a SYSIN data set. This is a required DD statement unless a control statement is specified in the PARM field of the EXEC JCL statement.

Note: STEPCAT DD statements are prohibited. FDRCONVT will abend if a STEPCAT DD statement is encountered. The INCAT parameter can be used to specify catalogs to be searched for non-VSAM data sets catalogued outside the standard order of search.

CONTINUED . . .

## 52.83 The CONVERTVOL Command — format

```

CONVERTVOL  STATUS=SMS | INITIAL | NONSMS
CONVERTV    ,BYPASSACS
SIMULATE     ,CATLG=NO | YES
SIM          ,DSNENQ=USE | HAVE | TEST | NONE
            ,ENQ=RESERVE | ON | OFF
            ,ICFCORE=nnnnnn
            ,INCAT=(catalogname,catalogname,...)
            ,MAXCARDS=nnnnn
            ,MGMTCLAS=management class name
            ,MULTIVOL=NO | YES
            ,PRINT=ALL | INELIG
            ,REDETERMINE=NO | YES
            ,SELTERR=YES | NO
            ,STORCLAS=storage class name
            ,VOL=(vvvvvvv,vvvvvvv,...)

```

**CONVERTVOL  
or SIMULATE  
COMMAND** This control statement is required. Multiple CONVERTV or SIMULATE statements are allowed. The statements are processed in the order in which they appear in the control stream.

CONTINUED . . .

## 52.83 CONTINUED . . .

**OPERANDS STATUS=**

Specifies the desired status of the volume when conversion or simulation is complete. If the volume is already in the desired status, no action is taken and the disk remains unchanged unless STATUS=SMS and REDETERMINE=YES are specified.

**SMS** — specifies that the volume is to be converted to SMS format. This is the default. The volume must have an indexed VTOC and must be defined to an SMS storage group in order for conversion to be successful. The volume is first placed in INITIAL status and all data sets on the volume are then converted. If any data set is ineligible for conversion, the volume remains in INITIAL status. If the volume is already in SMS status, no action is taken unless REDETERMINE=YES is also specified.

**INITIAL** — specifies that the volume is to be placed in INITIAL status. When a volume is in INITIAL status, no new allocations can take place on the volume. INITIAL status is used to prevent new allocations in preparation for conversion to SMS format. Volumes in INITIAL status may contain both SMS and non-SMS data sets. If the volume is already in initial status, no action is taken.

No data sets are converted to or from SMS format when a volume is placed in INITIAL status.

When a volume is converted to INITIAL status from NONSMS status, it must have an indexed VTOC. The volume need not be assigned to an SMS storage group to be converted to INITIAL status, but a storage group must be assigned before the volume can be converted to SMS format. If the volume is specified as part of a group (i.e., the '\*' mask character is used in the VOL= parameter) then the volume must be defined to an SMS storage group in order to be converted to INITIAL status from NONSMS status.

**NONSMS** — specifies that the volume is to be converted to NONSMS status. It does not matter whether the volume is assigned to an SMS storage group unless the volume is specified using the '\*' mask character in the VOL= parameter. In this case the volume must NOT be defined to an SMS storage group in order to be de-converted.

**BYPASSACS**

Specifies that the ACS routines are not to be called when converting data sets to SMS management. If BYPASSACS is specified, STORCLAS must also be specified on the CONVERTVOL or SIMULATE command or the SELECT control statement(s) to provide valid SMS storage classes for the data sets being converted. If a valid SMS storage class is not available for a data set, the data set cannot be converted to SMS management.

The user must have RACF FACILITY class authority to the STGADMIN.ADR.RESTORE.BYPASSACS resource in order to specify BYPASSACS.

**CATLG=**

**NO** — specifies that uncatalogued data sets or data sets not catalogued in the standard order of search are not to be catalogued or recatalogued in the standard order of search when converting a volume to SMS management. These data sets are not eligible for conversion to SMS if CATLG=NO is specified. This is the default.

**YES** — specifies that uncatalogued data sets or data sets not catalogued in the standard search order should be catalogued or recatalogued in the standard order of search when the volume is converted to SMS management.

Note: If non-VSAM data sets are catalogued outside the standard order of search, the INCAT parameter must be specified to indicate what catalogs the data sets can be found in.

The CATLG parameter is ignored unless STATUS=SMS is specified.

Multivolume uncatalogued data sets are never considered eligible for conversion, even if CATLG=YES is specified.

CONTINUED . . .



## 52.83 CONTINUED . . .

**DSNENQ=**

Specifies the type of ENQ to be performed on the data sets on the volume. This parameter is optional. Any data set for which the ENQ fails is not eligible for conversion. The default for actual conversion is USE, i.e., the data set is to be enqueued EXCLUSIVE and the operator is not to be prompted. If conversion is only being SIMulated, the default is TEST.

**USE** — the data set is enqueued. If the ENQ fails the data set is not converted. The operator is not prompted. This is the default.

**HAVE** — the data set is enqueued, and if the ENQ fails, FDRCONVT will issue a message to the operator (FDRW27). The operator can respond WAIT, NOWAIT, or RETRY. If WAIT is specified, FDRCONVT will wait for the data set to become available. The job could time out. If NOWAIT is specified, FDRCONVT will issue a warning message and the data set will not be converted. If RETRY is specified, FDRCONVT will try the ENQ again.

**TEST** — The data sets will only be tested to see if they are active. They will not be enqueued. Data sets for which the ENQ fails are considered ineligible for conversion. Note that a user could access the data set after FDRCONVT has issued the ENQ.

**NONE** — No data set ENQ will be issued.

Caution: when converting a shared DASD volume, the volume should be offline to other systems unless a cross-system ENQ facility is available and the SYSDSN QNAME is broadcast across systems.

**ENQ=**

**RESERVE** — specifies that FDRCONVT is to issue a RESERVE on the disk volume. This will lock out a SHARED DASD system from accessing this pack, unless a cross-system ENQ facility is available. This is the default.

**ON** — specifies that FDRCONVT is to issue an ENQ for the VTOC.

**OFF** — specifies that FDRCONVT should not issue an ENQ for the VTOC.

The ENQ/RESERVE is held only while the F4DSCB and VTOCIX are being updated, rather for the duration of the conversion process. The ENQ/RESERVE may be issued more than once (e.g., when converting the volume from NONSMS to SMS, an ENQ/RESERVE is issued when the INITIAL indicator is set on, and again when the SMS indicator is set on). Because a status of INITIAL prevents allocations on the volume, it is not necessary for FDRCONVT to maintain an ENQ on the VTOC while data sets are being converted.

**ICFCORE=**

Specifies that FDRCONVT is to increase the size of the tables used to store the ICF VSAM clusters and component names. The value is specified in bytes and must be large enough to contain all of the VSAM names.

Note: Specifying ICFCORE= will increase the FDRCONVT memory requirement by the value specified. The default value imposes no additional memory requirement.

The default value is 524288, which normally holds about 1100 ICF VSAM components.

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## 52.83 CONTINUED . . .

- INCAT=** Specifies the catalogs to be searched for non-VSAM data sets catalogued outside the standard order of search if CATLG=YES is specified when converting to SMS format.
- The INCAT parameter is ignored unless STATUS=SMS and CATLG=YES are also specified.
- In order to specify the INCAT parameter, the user must have RACF facility class authorization to the STGADMIN.ADR.CONVERTV.INCAT resource.
- Caution: the INCAT parameter **MUST** be specified if there are data sets catalogued outside the standard order of search and CATLG=YES is specified. If INCAT is not specified and there are data sets catalogued outside the standard order of search, they will appear to be uncatalogued to FDRCONVT. If CATLG=YES is also specified, then these data sets will be catalogued in both the original catalog and the standard order of search catalog when conversion is complete.
- MAXCARDS=** Enables FDRCONVT to accept additional SELECT/EXCLUDE statements. Default is a maximum of 250 SELECT or EXCLUDE statements for each CONVERTVOL or SIMULATE statement. An unlimited number of CONVERTVOL or SIMULATE statements may be specified.
- MGMTCLAS=** Specifies the SMS management class name which is to be passed to the ACS routines for all data sets unless overridden by a SELECT statement. Must be a valid SMS management class name defined in the active configuration. The default is that the management class name already assigned to the data set is used if there is one. The management class name specified may be changed by the ACS routines and may not be the one assigned to the data set unless BYPASSACS is also specified.
- MULTIVOL=** Indicates whether multivolume data sets are eligible for conversion to or from SMS management if all volumes on which the data set resides are not specified in the VOL= parameter.
- NO** — specifies that multivolume data sets which have extents that reside on volumes not specified in the VOL= parameter are not eligible for conversion to or from SMS management. This is the default.
- YES** — specifies that multivolume data sets which have extents that reside on volumes not specified in the VOL= parameter are eligible for conversion to or from SMS management. Volumes not specified in the VOL= parameter will be dynamically allocated if needed.
- When converting to SMS management, the first volume on which a multivolume data set resides must be specified in the VOL= parameter. For VSAM data sets being converted to SMS management, the FIRST volume on which any of the data or index components of either the base cluster or any alternate index cluster reside must be specified in the VOL= parameter. This restriction does not apply if volumes are being converted to NONSMS status.
- All pieces of a multivolume data set must be catalogued in the same catalog using an alias.
- All volumes on which a multivolume data set resides must be assigned to the same SMS storage group and all must be eligible for conversion.

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- PRINT=** **ALL** — specifies that information on all data sets processed, including data sets eligible and ineligible for conversion, is to be printed.
- INELIG** — specifies that only information on data sets which are ineligible for conversion to the desired status is printed.
- REDETERMINE=** **NO** — specifies that SMS class information is not to be reset for data sets that have already been converted to SMS management even if the ACS routines return different classes from those already assigned to the data set. This is the default.
- YES** — specifies that all data sets on the volume are to be examined for eligibility for conversion and SMS class information is to be reset for data sets already converted to SMS management if the class information has changed.
- The REDETERMINE parameter is ignored unless STATUS=SMS is also specified.
- Note: REDETERMINE=YES can be used on the SIMULATE control statement to insure that the SMS classes assigned to data sets on SMS-managed volumes are valid and are the correct classes that would be assigned by the ACS routines. This function is useful when the ACS routines have been changed or when a volume has been restored at a site where the ACS routines are different from those where the volume was backed up.
- SELTERR=** **YES** — specifies that FDRCONVT is to set a condition code of 12 if a SELECT or EXCLUDE statement is not referenced. This is the default.
- NO** — specifies that FDRCONVT is not to set a condition code of 12 if a SELECT or EXCLUDE statement is not referenced.
- STORCLAS=** Specifies the SMS storage class name which is to be passed to the ACS routines for all data sets unless overridden by a SELECT statement. Must be a valid SMS storage class name defined in the active configuration. The default is that the storage class name already assigned to the data set, if any, is used. The storage class name specified may be changed by the ACS routines and may not be the one assigned to the data set unless BYPASSACS is also specified.
- VOL=** Specifies the volume serial number of the disk volume(s) to be converted. The volume(s) will be dynamically allocated. Multiple volume serial numbers may be specified in any of the following formats:
- 1.) A list of volume serial numbers may be given, enclosed in parentheses, up to a maximum of 20, e.g., VOL=(TSO001,TSO002,TSO003)
  - 2.) A volume group may be specified by placing an asterisk at the end of the volser prefix, e.g., VOL=TSO\*
  - 3.) The two may be combined, e.g. VOL=(TSO\*,PROD\*,ABC001)
  - 4.) All online volumes may be specified by: VOL=\*
- The user must have RACF DASDVOL authorization to all of the volumes being converted.
- If the '\*' masking character is used to specify a group of volumes, the volumes must be assigned to an SMS storage group in order to be converted to INITIAL or SMS status. In order to be converted out of SMS status, the volumes must not be assigned to an SMS storage group if the '\*' masking character is used.**

CONTINUED. . .

## 52.84 The SELECT Command — Format

```

SELECT  ALLDSN / DSN=datasetname / DSG=dataset group name
      S  ,MGMTCLAS=management class name
EXCLUDE ,STORCLAS=storage class name
      X  ,VOL=vvvvvvv

```

The SELECT or EXCLUDE statement specifies special processing that is to be performed for a particular data set or group of data sets on a volume being converted. SELECT and EXCLUDE statements are processed in the order in which they appear in the control stream.

OPERANDS	DSN=	Specifies a unique data set name or cluster to be selected or excluded. From 1 to 44 characters may be specified.
	DSG=	Specifies that a group of data sets matching the characters specified are to be processed. E.g.,  EXCLUDE DSG=TEST  will cause all data sets starting with the characters 'TEST' to be considered ineligible for conversion.
	ALLDSN	Specifies that all data sets on the volume are to be processed. ALLDSN should be specified after all SELECT or EXCLUDE statements for other data sets are specified if all data sets on the volume are to be processed.
	MGMTCLAS=	Specifies the SMS management class name which is to be passed to the ACS routines for the selected data set. Must be a valid SMS management class name defined in the active configuration. The default is that the management class already assigned to the data set, if any, is used. The management class name specified may be changed by the ACS routines and may not be the one assigned to the data set unless BYPASSACS is also specified.
	STORCLAS=	Specifies the SMS storage class name which is to be passed to the ACS routines for the selected data set. Must be a valid SMS storage class name defined in the active configuration. The default is that the storage class name already assigned to the data set, if any, is used. The storage class name specified may be changed by the ACS routines and may not be the one assigned to the data set unless BYPASSACS is also specified.
	VOL=	Specifies the volume(s) to which this SELECT/EXCLUDE statement is to apply. A trailing asterisk can be used as a mask parameter to indicate a group of volumes.

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**52.85 FDRCONVT Examples****EXAMPLE 1 PREPARE A VOLUME FOR LATER CONVERSION TO SMS MANAGEMENT**

Prepare a volume for later conversion to SMS management by using FDRCONVT to place the volume in INITIAL status. Once the volume is in INITIAL status, no new allocations can take place on the volume, and existing data sets on the volume cannot be extended to new volumes. No processing of data sets is done by FDRCONVT when converting volumes to INITIAL status.

```
//CONVT      EXEC      PGM=FDRCONVT, REGI ON=1024K
//SYSPRI NT   DD        SYSOUT=*
//SYSUDUMP    DD        SYSOUT=*
//SYSI N      DD        *
      CONVERTV  VOL=PACK01, STATUS=I NI TI AL
```

**EXAMPLE 2 SIMULATE CONVERSION OF SEVERAL VOLUMES TO SMS MANAGEMENT**

Simulate conversion of all of the data sets on several volumes to SMS management. No changes are made to the volumes or the data sets. The output can be used to identify data sets which are ineligible for conversion. The VTOC and data sets are not to be enqueued.

```
//SI MUL      EXEC      PGM=FDRCONVT, REGI ON=1024K
//SYSPRI NT   DD        SYSOUT=*
//SYSUDUMP    DD        SYSOUT=*
//SYSI N      DD        *
      SI M  VOL=(PROD*, TEST*), STATUS=SMS,
      ENQ=OFF, DSNENQ=NONE
```

**EXAMPLE 3 CONVERT A VOLUME TO SMS MANAGEMENT**

Convert a volume containing uncatalogued data sets and data sets catalogued outside the standard order of search to SMS management. The uncatalogued data sets are to be catalogued. The data sets catalogued outside the standard order of search (i.e., data sets which previously required STEPCATs) are to be recatalogued in the standard order of search.

```
//CONVT      EXEC      PGM=FDRCONVT, REGI ON=1024K
//SYSPRI NT   DD        SYSOUT=*
//SYSUDUMP    DD        SYSOUT=*
//SYSI N      DD        *
      CONVERTV  VOL=DBPAK1, STATUS=SMS,
      I NCAT=(USER. CATALOG. ONE,
      USER. CATALOG. TWO),
      CATLG=YES
```

**EXAMPLE 4 CONVERT MULTIVOLUME DATA SETS TO SMS MANAGEMENT**

Convert volumes containing multivolume data sets to SMS management. The MULTIVOL=YES parameter indicates that volumes which are not specified in the VOL= parameter can be dynamically allocated. The first extent of each non-VSAM data set and the first extent of each VSAM data or index component or alternate index data or index component must be on a volume specified in the VOL= parameter.

```
//CONVT      EXEC      PGM=FDRCONVT, REGI ON=1024K
//SYSPRI NT   DD        SYSOUT=*
//SYSUDUMP    DD        SYSOUT=*
//SYSI N      DD        *
      CONVERTV  VOL=(DBPAK1, DBPAK2), STATUS=SMS,
      MULTI VOL=YES
```

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## 52.80 CONTINUED. . .

**EXAMPLE 5 VERIFY THAT SMS CLASSES ASSIGNED TO DATA SETS ARE CORRECT**

Simulate conversion of a volume which is already SMS-managed. The REDETERMINE=YES parameter is used to identify those data sets that need to have their SMS class information reset because the ACS routines return classes different from those already assigned.

REDETERMINE=YES may be useful when the ACS routines have been changed, causing new classes to be assigned. If any data sets need to have their class information reset, the SIMULATE command can be changed to CONVERTV to perform the conversion.

```
//CONVT      EXEC      PGM=FDRCONVT, REGI ON=1024K
//SYSPRI NT   DD        SYSOUT=*
//SYSUDUMP    DD        SYSOUT=*
//SYSI N      DD        *
      SI MULATE VOL=SMS301, STATUS=SMS,
      REDETERMI NE=YES,
```

**EXAMPLE 6 CONVERT VOLUMES OUT OF SMS MANAGEMENT**

All volumes beginning with 'TSO' are to be converted to NONSMS status. Multivolume data sets can be converted if they reside on volumes specified in the VOL= parameter. Volumes containing PDSEs cannot be converted from SMS management.

```
//DECONVT     EXEC      PGM=FDRCONVT, REGI ON=1024K
//SYSPRI NT   DD        SYSOUT=*
//SYSUDUMP    DD        SYSOUT=*
//SYSI N      DD        *
      CONVE RTV VOL=TSO*, STATUS=NONSMS
```

**EXAMPLE 7 ASSIGN STORAGE AND MANAGEMENT CLASSES TO SELECTED DATA SETS**

Convert data sets with high-level qualifiers beginning with 'TEST' or 'PROD' to SMS. All other data sets on the volume are ineligible for conversion. Data sets beginning with 'TEST' are to get a storage class of 'BASE' and a management class of 'MONTHMIG'. Data sets beginning with 'PROD' are to get a management class of DBMIG.

```
//CONVT      EXEC      PGM=FDRCONVT, REGI ON=1024K
//SYSPRI NT   DD        SYSOUT=*
//SYSUDUMP    DD        SYSOUT=*
//SYSI N      DD        *
      CONVE RTV VOL=(WRKA*, WRKB*), STATUS=SMS
      SELE CT DSG=TEST, STORCLAS=BASE,
      MGMTCLAS=MONTHMI G
      SELE CT DSG=PROD, MGMTCLAS=DBMI G
```

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**52.90 FDRCHSM - CONVERSION AID FROM DFHSM TO FDRABR**

Included with the FDRABR product is a utility to automatically convert data sets migrated under DFHSM to FDRABR archived data sets. Installations seeking the outstanding performance, reliability, and features of the FDRABR DASD management system with data now under DFHSM control will be able to safely move the data to FDRABR control. The conversion aid runs as a background job, and is designed for incremental conversion to ABR, selecting a user controlled number of migration level two (ML2) tapes for each increment. This allows for the conversion to be done as time and resources permit. User control of the process is provided for by a simple control card input, and optional system operator interaction. All DFHSM interactions are done using documented interfaces, with no dependencies on DFHSM internals. The conversion aid does do extensive validation to insure that data integrity is maintained, and a restart capability is provided in case of abends or system failures while the conversion aid is running.

The conversion is done by recalling all of the migrated datasets on a selected ML2 volume, then invoking FDRABR to archive those datasets. The process can continue automatically for a user specified number of ML2 volumes during one execution of the conversion aid. Also, if resources permit, multiple conversion runs can be done concurrently. The conversion aid has no dependencies on DFHSM internals, as everything is driven based on the documented DFHSM external commands and reports.

The conversion process is intended to be done over a planned period of time. The amount of time required for the conversion is dependent on the amount of data to be converted to FDRABR control, and the available resources within the environment. The conversion process should be started slowly, only doing a few ML2 tapes at a time, so that experience in the operation of the utility can be gained, and estimates of how long to do each tape in the environment can be determined. After some experience is gained, the conversion can proceed at the desired pace.

All of the interaction with DFHSM is through the use of the DFHSM TSO command interface. The conversion aid builds sets of TSO commands to be issued in a sequential dataset, then automatically invokes TSO in batch mode to execute the commands. This process completely eliminates any dependencies on the internals of DFHSM, its control files, and the format of the data that is to be converted. The conversion aid is dependent on the externals, the documented commands and certain report formats.

After validating the environment and the JCL, the conversion aid issues a request to DFHSM for an inventory of all of the ML2 tapes. Using that list, and the specified criteria on the control statement input, the conversion aid selects an ML2 volume to be converted. Once an ML2 volume is selected for processing, the conversion aid then requests an inventory of the migrated datasets on the selected ML2 volume. From the inventory of datasets on the ML2 volume, DFHSM TSO RECALL commands are built, directing the recalls to the DASD volume specified by the user, and invokes the batch TSO processor to issue the RECALL commands.

Upon completion of all of the RECALL commands, the conversion aid validates that each dataset was properly recalled. For all datasets that were properly recalled, control cards are built for those datasets to be archived for automatic recall by FDRABR, and FDRABR is invoked to archive the datasets. Once the FDRABR archival process is complete, then if so specified by the user, another ML2 volume is selected and processed in the same manner.

The conversion process is a very safe way to help customers move datasets migrated by DFHSM to an archived FDRABR format. The design of the program is completely oriented towards data integrity, and as such is not a "fast" process. The conversion aid does have a restart capability, should there have been a failure during the recall or archive process, to resume processing. The conversion aid also has a simulation mode. Use of this mode will validate that the conversion aid is working with DFHSM, and provides the user with a list of ML2 volumes that will be processed.

Complete documentation is available in the machine-readable version. [See Section 90.06](#) for "How to Print the Documentation".

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**53.01 REPORTING FACILITY OVERVIEW**

AUTOMATIC BACKUP & RECOVERY provides a report facility which permits the user easy access to the control information generated and/or compiled by the ABR system. This facility, provides the information in preformatted reports. Each report is selectable through the PRINT command.

**WHY A  
REPORT  
FACILITY**

Each execution of ABR generates control information based on volume initialization of the disks being processed and the control statements present at execution time. The information details the data sets and/or volumes processed and provides an audit trail and input to a manual recovery procedure, should it become necessary. ABR, in addition to printing the pertinent information, also stores it for subsequent processing. Thus, the report facility is the vector between the stored information and the user.

**ISPF  
DIALOG  
SUPPORT**

ABR offers the user ISPF dialog support to facilitate the use of the ABR reports for users that operate under the Interactive System Productivity Facility (ISPF) on MVS systems with TSO. The example below shows the panel display for option 1 of the FDRABR primary option menu.

— FDR Automatic Backup & Recovery — FDRABR Report Panel —

Report Option = = =

Blank — Archive

2 — Backup

3 — Scratch

4 — Catalog

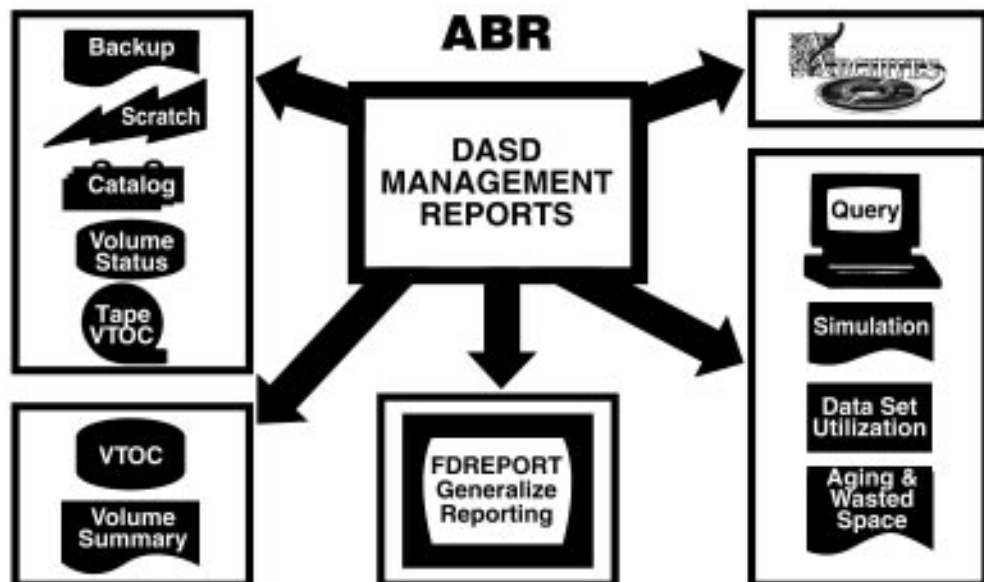
5 — Volume Status

6 — FDREPORT

**REPORTING  
FACILITY**

**Complete volume and data set reporting.** ABR will, on request, list all backup files created by ABR, list all data sets archived, list tape backup information on each data set that was dumped, etc. ABR will report on ICF VSAM type files by both the cluster name and component names.

The selection criteria on these files is by cluster name. Extensive VSAM reporting is available thru program FDREPORT ([Section 53.20](#)). These reports can be printed by data set name or volume. ABR will format the report for either printers or CRTs.



**53.02 AVAILABLE ABR REPORTS**

**AVAILABLE REPORTS** ABR offers the user a variety of report types. The standard reports are generated using simple control statements. A generalized reporting facility is also available. Simulation reports are available using the FDRABR program.

**FDRABR REPORTS**

**Archive Report** – prints the data sets that have been archived from disk to tape.

**Catalog Report** – prints the ABR Catalog, listing the disk volumes and their related backup tapes.

**Scratch Report** – prints the ABR catalog, listing the data sets that been scratched and their related backup tapes.

**VTOC Report** – prints the contents of the VTOC for one or more disk volumes in selected format. The entire volume or selected data sets may be printed.

**Tape VTOC Report** – prints the contents of the formatted VTOC at the beginning of FDR, DSF and ABR backup tapes. The data sets which were dumped to this backup can be displayed in ABR or IEHLIST format.

**Backup Reports** – prints the backup information (backup date, volumes backup to, etc.) for the data sets selected. The most current backup and optionally previous (OLDBACKUP) information can be requested.

**Data Set Utilization by ID** – ABR will, on request, report by index on the number of data sets owned by type (ex: PS, PO) and the number of tracks owned by these data sets. Also, the user can request aging statistics by index. The index can be the highest level index or some other index level within the data set name.

**Wasted Space Reports** – ABR will, on request, print volume utilization reports. ABR will report on the percentage of free space on a volume and the amount of used space within PDS and sequential data sets.

**Volume Status Report** – lists the ABR status of all or selected disk volumes ONLINE at execution time.

**FDREPORT FACILITY** ABR offers the user a generalized report program to display or print information about data sets, entire disk volumes or entire installations. This report is detailed in [Section 53.20](#).

FDREPORT functions as a data extract or display processor for use with the VTOC. The user can select and display information about a data set. backup information, size and position of the data set, data characteristics, if cataloged or protected, etc., can be selected and positioned on the report using simple control statements. The user's report can also be sorted using any of the fields selected.

**FDRABR REPORTS**

**Simulation** – ABR has the capability to execute all of its dump or archive functions in a simulation mode. ABR will display for the user all of the data sets selected in this execution without actually dumping or archiving the data sets. The data sets to be selected are printed in PRINT VTOC format.

**Simulated Archive Report** – prints the data sets that would be archived or scratched if ABR were to be executed TODAY with the ARCHIVE or SUPERSCRATCH option. This is very useful when setting up ARCHIVE operations or data set naming conventions. The user will be able to see the effect of the operation before actual implementation.

**Simulated Restore Report** – Data set RESTORE operations can be executed in simulation mode. The data set names to be restored and their associated backup volumes are displayed.

NOTE: The above simulation reports are produced by executing program FDRABR.

CONTINUED . . .

## 53.02 CONTINUED . . .

**FDRQUERY  
REPORTS**

**Backup Simulation** – FDR has the capability of reporting the number of data sets and their associated tracks that would be dumped using FDR versus ABR incremental backups. The number of tracks and percentage saved is reported.

**Archive Simulation** – FDR has the capability of reporting by date grouping the number of data sets and the tracks they occupy by last reference date. A summary by device type is also supplied.

NOTE: The above simulation reports are produced by executing program FDRQUERY  
([Section 10](#)).

**53.03 PRINT UTILITY JCL REQUIREMENTS**

The following Job Control Statements are required to execute the Report Facility AS A SEPARATE UTILITY FUNCTION:

<b>JOB STATEMENT</b>	The JOB statement is user-specified and depends upon installation standards.
<b>EXEC STATEMENT</b>	Must specify the name of the ABR print utility program. This program is FDRABRP for all utility print functions except simulation, where the program to be specified is FDRABR. The EXEC statement may also contain the region requirements of 256K. The user can also specify the PARM= parameter; if present, it will be processed as the first control statement.
<b>STEPCAT DD STATEMENT</b>	A STEPCAT may be required for the VTOC or backup report, if ICF VSAM files are present and their high level index is not aliased in the master catalog.
<b>SYSPRINT DD STATEMENT</b>	Specifies the primary output message data set. This is a required DD statement for all PRINT functions and is usually a SYSOUT data set.
<b>ABRMAP DD STATEMENT</b>	Specifies the Report data set. when ABRMAP is not found within the JCL stream, the reports will be output to the SYSPRINT data set. Usually a SYSOUT data set.
<b>ABRSUM DD STATEMENT</b>	Required by the PRINT VTOC report by data set index. Usually a SYSOUT data set.
<b>VSAMPRT DD STATEMENT</b>	Required by the PRINT TVTOC command when VSAM=YES or VSAM=DUMP is present. Usually a SYSOUT data set.
<b>ARCHIVE DD STATEMENT</b>	Specifies the ABR ARCHIVE control file required for the PRINT ARCHIVE command. MVS users need not specify this DD statement if the ARCHIVE control file is the standard file name specified in the ABR option table and is cataloged. The control file will be dynamically allocated to DDNAME ARCHIVE#.
<b>DISKXXXX DD STATEMENT(S)</b>	Specifies the DASD volumes(s) to be processed. xxxx is any combination of valid alphanumeric digits (0-9, A-Z). These DD Statements are normally required for the VTOC Report and can be allocated to either real or virtual DASD. A maximum number of 100 DD statements for each execution is the ABR default found in the option table which can be changed by using FDRZAPOP with the following command 'ZAP DDCNT=nnn' where nnn is 5-400. When executing on an MVS system and specifying VOL/VOLG operands, any ONLINE volume will be dynamically allocated with a DDNAME of DISKONL1.
<b>TAPEXXXX DD STATEMENT(S)</b>	Specifies the input backup data set to be used for the PRINT TVTOC Command. xxxx is any combination of valid alphanumeric digits (0-9, A-Z). The user may specify multiple TAPExxxx DD statements, and all of them will be processed in one execution. If the backup data set was created by ABR, the DD statement must specify the full data set name, volume serial, unit, file sequence number and disposition, since the operating system cannot retrieve ABR tapes through the catalog.
<b>SORTLIB DD STATEMENT</b>	Specifies the data set that contains the SORT functional modules. Required by selected PRINT functions, if your installation needs a SORTLIB DD Statement to perform sort operations.
<b>SYSOUT DD STATEMENT</b>	Specifies a data set for messages from the SORT program. Required by selected PRINT functions, if your installation's SORT program writes messages to a SYSOUT data set.

CONTINUED . . .

**53.03 CONTINUED . . .****SORTWKNN  
DD  
STATEMENTS**

Specify SORT work area data sets. Required by selected PRINT functions if your installation's SORT program required external work areas.

**SYSIN DD  
STATEMENT**

Specifies the control statement data set. Normally required for all ABR function unless input data is entered through PARM= on the execute statement.

**53.04 PRINT UTILITY COMMAND FORMAT****PRINT  
COMMAND  
FORMAT**

The PRINT command controls report selection from the report facility. The format of the PRINT command is as follows:

PRINT            report,operand1...,operandn

where:

report            – is a positional operand that defines the report type required.

operand(1-n)    – define the secondary control operands that further qualify the report type selected.

Since each command has its own related secondary operands, the commands will be documented separately.

**REPORT  
FORMATS**

Two formats are available for the ABR reports. The user can use the FORMAT operand of the PRINT command to specify the format that he wants, or he can let ABR choose the format based on the allocation of the report data set.

CRT Format: Uses 79-character print lines, and is intended for use on a cathode ray tube terminal. If the FORMAT operand is not specified, ABR will select this format if the report data set is allocated to a TSO terminal.

PRT Format: Uses 121-character print lines, including carriage control characters. This format is intended for use on hard-copy printers. If the FORMAT operand is not specified, ABR will select this format if the report data set is allocated to anything other than a TSO terminal.



53.05 ARCHIVE REPORT

COMMAND	PRINT	ARCHIVE
FORMAT	P	

,ADATE=yyddd  
 ,COPY=1 | 2  
 ,DELETE=YES | NO  
 ,DSN=(dsname,...,dsname), | DSG=(dsgrupp,...,dsgrupp)  
 ,EXPIRE=YES | NO  
 ,FORMAT=PRT | CRT  
 ,HEX  
 ,LINECNT=nn  
 ,RECALL=YES | NO  
 ,REORG%=nn  
 ,RESTORED=YES | NO  
 ,SDATE=yyddd | ,SDAYS=nnnn  
 ,SELTERR=YES | NO  
 ,SORT=YES | NO  
 ,SUM=YES | NO  
 ,VOL=(vvvvvv,...,vvvvv), | VOLG=(vvvvv,...,vvvvv)  
 ,XDAYs=nnn

CONTINUED . . .

53.05 CONTINUED . . .

<b>REPORT SUMMARY</b>	<p>The report generated by the PRINT ARCHIVE Command gives the user access to information stored by ABR for data sets that have been archived. The following information is made available to the user in printed format: Data set name, DASD volume ID and type, date archived, data set attributes, tape file number and volume serial number(s) and when the backup will expire.</p> <p>NOTE: If you specify a data set name with the DSN operand and this data set was archived multiple times, ABR will only display the most current copy. If you want to see all of the times the data set was ARCHIVED, specify DSG= the full data set name.</p>												
<b>ISPF DIALOG OPTION</b>	<p>Archive control file entries may be listed using the ISPF dialog support 'FDRABR Report Panel' option A.1. <a href="#">Section 56.01</a> of this manual further explains this support.</p>												
<b>ICF VSAM</b>	<p>ICF VSAM files are reported by the cluster name followed by its individual components. Selection criteria for VSAM files is only by cluster name.</p>												
<b>OPERANDS</b>	<table> <tr> <td><b>ADATE=</b></td><td> <p>Specifies the date the data set was archived. ABR will only process the data sets which match this date.</p> <p>The default is that the date is not checked.</p> </td></tr> <tr> <td><b>COPY=</b></td><td> <p>Specifies a unique copy number the user wants to process.</p> <p>The default, if COPY is not specified, is that both copies will participate in data selection.</p> </td></tr> <tr> <td><b>DELETE=</b></td><td> <p><b>YES</b> selects only the archived data sets that have been set for deletion and are subject to removal from the ARCHIVE control file.</p> <p><b>NO</b> selects only the archived data sets that have not been set for deletion.</p> <p>The default is that the above condition will not participate in data selection.</p> </td></tr> <tr> <td><b>DSN=</b></td><td> <p>Specifies string(s) from 1 to 44 characters in length. Only archived data sets or clusters having a name that matches the selection criteria (i.e.: the compare length is 44) will be selected for printing.</p> <p>The default is deferred to the DSG operand.</p> </td></tr> <tr> <td><b>DSG=</b></td><td> <p>Specifies string(s) from 1 to 44 characters in length. Only archived data sets or clusters having a name that matches the selection criteria (i.e.: the compare length is the length of data specified) will be selected for printing.</p> <p>There is a special form of the DSG operand. Leading periods (.) after DSG= indicate that the group name starts after one or more index levels. Each period indicates that one (1) index level is to be bypassed.</p> <p>EXAMPLE: DSG=..TST will select any data set with a third index level starting with 'TST'.</p> <p>The default is that no check is made for data set name if neither DSN nor DSG is specified.</p> <p>NOTE: DSN and DSG operands may be repeated and/or intermixed. A total of up to 200 strings may be specified.</p> </td></tr> <tr> <td><b>EXPIRE=</b></td><td> <p><b>YES</b> selects ONLY the archived data sets that have expired (data sets that are subject to removal from the ARCHIVE control file).</p> <p><b>NO</b> selects only the archived data sets that have not expired.</p> <p>The default is no expiration date check is made.</p> </td></tr> </table>	<b>ADATE=</b>	<p>Specifies the date the data set was archived. ABR will only process the data sets which match this date.</p> <p>The default is that the date is not checked.</p>	<b>COPY=</b>	<p>Specifies a unique copy number the user wants to process.</p> <p>The default, if COPY is not specified, is that both copies will participate in data selection.</p>	<b>DELETE=</b>	<p><b>YES</b> selects only the archived data sets that have been set for deletion and are subject to removal from the ARCHIVE control file.</p> <p><b>NO</b> selects only the archived data sets that have not been set for deletion.</p> <p>The default is that the above condition will not participate in data selection.</p>	<b>DSN=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only archived data sets or clusters having a name that matches the selection criteria (i.e.: the compare length is 44) will be selected for printing.</p> <p>The default is deferred to the DSG operand.</p>	<b>DSG=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only archived data sets or clusters having a name that matches the selection criteria (i.e.: the compare length is the length of data specified) will be selected for printing.</p> <p>There is a special form of the DSG operand. Leading periods (.) after DSG= indicate that the group name starts after one or more index levels. Each period indicates that one (1) index level is to be bypassed.</p> <p>EXAMPLE: DSG=..TST will select any data set with a third index level starting with 'TST'.</p> <p>The default is that no check is made for data set name if neither DSN nor DSG is specified.</p> <p>NOTE: DSN and DSG operands may be repeated and/or intermixed. A total of up to 200 strings may be specified.</p>	<b>EXPIRE=</b>	<p><b>YES</b> selects ONLY the archived data sets that have expired (data sets that are subject to removal from the ARCHIVE control file).</p> <p><b>NO</b> selects only the archived data sets that have not expired.</p> <p>The default is no expiration date check is made.</p>
<b>ADATE=</b>	<p>Specifies the date the data set was archived. ABR will only process the data sets which match this date.</p> <p>The default is that the date is not checked.</p>												
<b>COPY=</b>	<p>Specifies a unique copy number the user wants to process.</p> <p>The default, if COPY is not specified, is that both copies will participate in data selection.</p>												
<b>DELETE=</b>	<p><b>YES</b> selects only the archived data sets that have been set for deletion and are subject to removal from the ARCHIVE control file.</p> <p><b>NO</b> selects only the archived data sets that have not been set for deletion.</p> <p>The default is that the above condition will not participate in data selection.</p>												
<b>DSN=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only archived data sets or clusters having a name that matches the selection criteria (i.e.: the compare length is 44) will be selected for printing.</p> <p>The default is deferred to the DSG operand.</p>												
<b>DSG=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only archived data sets or clusters having a name that matches the selection criteria (i.e.: the compare length is the length of data specified) will be selected for printing.</p> <p>There is a special form of the DSG operand. Leading periods (.) after DSG= indicate that the group name starts after one or more index levels. Each period indicates that one (1) index level is to be bypassed.</p> <p>EXAMPLE: DSG=..TST will select any data set with a third index level starting with 'TST'.</p> <p>The default is that no check is made for data set name if neither DSN nor DSG is specified.</p> <p>NOTE: DSN and DSG operands may be repeated and/or intermixed. A total of up to 200 strings may be specified.</p>												
<b>EXPIRE=</b>	<p><b>YES</b> selects ONLY the archived data sets that have expired (data sets that are subject to removal from the ARCHIVE control file).</p> <p><b>NO</b> selects only the archived data sets that have not expired.</p> <p>The default is no expiration date check is made.</p>												

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## 53.05 CONTINUED . . .

<b>FORMAT=</b>	<p>Specifies that the report is to be prepared using other than the default selected by the program.</p> <p>PRT produces a 121 character line.</p> <p>CRT produces a 79 character line. (See report formats in <a href="#">Section 53.04</a> for further explanation).</p>
<b>HEX</b>	<p>Specifies that the ARCHIVE control file is to be printed using a special character/hexadecimal format. Individual fields are NOT identified.</p> <p>The default is that the report is produced in character format, with the data identified by field within the records.</p>
<b>LINECNT=</b>	<p>Specifies the maximum number of lines each report page can contain. The number can be any value from 10 to 99, inclusive.</p> <p>The default is each page will contain a maximum of 58 lines.</p>
<b>RECALL=</b>	<p>Specifying RECALL=YES selects only the archived data sets that have been archived by FDRABR with the RECALL option. Specifying RECALL=NO selects only the archived data sets that have not been archived with the RECALL option.</p> <p>The default is that the above condition will not participate in data selection.</p>
<b>REORG%=</b>	<p>Specifies a minimum percent of free space the user requires in the ARCHIVE control file. If the free space is less than the nn%, message FDR428 is issued, listing the actual percent of free space.</p> <p>The default is a minimum 10% free space in the ARCHIVE control file.</p>
<b>RESTORED=</b>	<p><b>YES</b> results in the selection of all data set(s) that have been restored or attempted to be restored.</p> <p><b>NO</b> results in selection of all data set(s) that have not been restored.</p> <p>The default is that no checks are made for restored data sets.</p>
<b>SDATE=</b>	<p>Specifies that ONLY data sets that were archived on or after the date specified will be selected for printing. This option can reduce the execution time of the print program if many data sets have been archived.</p> <p>The default is that the entire ARCHIVE control file will be searched.</p>
<b>SDAYS=</b>	<p>Specifies a value in days used to calculate a prior Julian date. This date is used as described above by SDATE operand. This option can reduce the execution time of the print program if many data sets have been archived.</p> <p>The default is that the above condition will not participate in data selection.</p> <p>NOTE: SDAYS= value is subtracted from today's date creating a prior Julian date. SDAYS or SDATE option will NOT function properly if the ARCHIVE file is NOT in DATE sequence.</p>
<b>SELTERR=</b>	<p><b>YES</b> – Specifies that a condition code of 12 will be set if there are no archived data sets that match the selection criteria on this PRINT command.</p> <p><b>NO</b> – Specifies that a condition code of 12 will not be set if there are no archived data sets that match the selection criteria on this PRINT command.</p> <p>The default is YES.</p>

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53.05 CONTINUED . . .

- SORT=** **YES** results in the ARCHIVE report being printed in data set name sequence.  
**NO** results in the report being printed in date sequence (most current to least current).  
 The default is SORT=YES except when the input device or the output device is a TSO terminal, which causes SORT=NO to become the default.
- SUM=** **YES** results in the printing of the summary report after the detail listing.  
**NO** results in the summary report being bypassed.  
 The default is YES.
- VOL=** Specifies the DASD volume serial number which the data set(s) were archived. This is an exact match operand (i.e.: compare length 6). Multiple volume serial numbers may be specified if entered (v. . .v, . . .v. . .v).  
 The default is deferred to the VOLG operand.
- VOLG=** Specifies the prefix of the DASD volume which the data set(s) were archived. This is not an exact match operand (i.e.: compare length is the length of data specified). Multiple volume groups may be specified if entered (v. . .v, . . .v. . .v).  
 The default is, if neither VOL nor VOLG is specified, the DASD volume will not participate in data selection.  
 NOTE: VOL and VOLG operands may be repeated and/or intermixed. A total of up to 100 strings may be specified.
- XDAYS=** Specifies a value in days used to calculate a future expiration date. This date is used when calculating the number of expired entries printed in the summary report. This value is also used if the user selects expired entries by coding EXPIRE operand.  
 The default is 10 days.

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53.05 ARCHIVE REPORT

A B R A R C H I V E R E P O R T I L L U S T R A T I O N

FDR303 CARD IMAGE - \*PRINT ARCHIVE

GENERATE ABR ARCHIVE REPORT

\*

FDR400 AUTOMATIC BACKUP/RECOVERY REPORT - FDRABRP VER 4.8 - INNOVATION DATA PROCESSING DATE - 84.066 PAGE - 1

FDRABR ARCHIVE REPORT - DSNNAME SEQUENCE

**-- -- -DATA SET NAME-- -- --**	*-DISK VOL-*	*--DATE OF --*D/S	RECBLOCK	LBP	BK	**---DSN	TAPE	INFO---**
SERIAL STY	ARCHIVE	EXPT OORG	FM SIZE LRECL ALLOC/TRK*	TY CN	SUFFIX	FN VOL-SERIAL(S)		
AIRLINE.RATE.CONTROL. DATABASE	ID3330 1 09	82.305 82.335 PS	FB 12960 80 5A 62*	01 1	B1823050	0 MSS001		
ANALYSIS.FILE	ID3380 1 0E	82.280 83.280 PS	F 80 80 5T 0	D3 1	B1822800	1 000304.000500		
ARRAY.TEST	ID3380 1 0E	82.280 83.280 DA	F 6400 0 6T 3	D3 1	B1822800	1 000304.000500		
BUSINESS.FILE	ID3350 1 08	82.280 82.340 IS	FB 1200 400 90A 276*	D3 1	B1822800	2 000500		
DISASTER.FILE	ID2314 1 08	82.305 82.335 PS	VB 1004 100 60T 58	01 1	B1823050	0 MSS001		
ENERGY.FILE	ID3330 1 09	82.305 83.305 PS	FT 15000 15000 5T 3	01 1	B1823050	0 MSS001		
FDRLOAD.LIBV41	ID3350 1 0B	82.045 83.045 PO	U 13030 0 3C 137	D3 1	B1820450	1 010567		
PAYROLL.DETAIL.D81019	ID3380 1 0E	82.280 83.280 IS	FB 800 80 100A 297*	D3 1	B1822800	1 000304.000500		
PAYROLL.MASTER.Y1980	ID3350 1 0B	82.010 88.010 ISU	VB 804 40 900A 7860*	D3 1	B1820100	12 001507		
QUARTER.BILLFILE	ID3330 1 09	82.280 83.280 PS	F 6000 6000 10C 152	D3 1	B1822800	2 000500		
***CLUSTER- - -TAX.MASTER.Y1983								
TAX.INDEX	ID3330 1 09	84.001 91.001 EF	U 4096 0 IC 0	D3 1	B1840010	1 000710		
TAX.DATA	ID3330 1 09	84.001 91.001 EF	U 4096 0 50C 0	D3 1	B1840010	1 000710		
WORKA.FILE	ID3330 1 09	82.280 83.280 PSU	FB 1000 100 2A 729*	D3 1	B1822800	2 000500		
YEARLY.W2FILE.Y1980	ID3330 1 09	82.030 82.060 PS	FB 120 1200 100T 0	0B 1	B1820300	0 ID3350		
		83.030		D3 2	B2820300	1 000504		

FDR499 FDRABRP PROCESSING COMPLETE

\*\*-- -- -VOL TY FIELD SHOWS DEVICE TYPE OF DATA SET ARCHIVED- --\*

08- -2314 09- -3330 0D- -3330-1 0A- -3340 0B- -3350 06- -2305-01 07- -2305-02 0E- -3380 0C- -3375

\*\*-- -- -BK TY FIELD SHOWS DEVICE TYPE OF ARCHIVE BACKUP- --\*

00- -3400-6 01- -3330V 06- -2305-1 07- -2305-2 08- -2314 09- -3330 0A- -3340 0B- -3350 0C- -3375

0D- -3330-11 0E- -3380 C3- -3400-3 CB- -2400 D3- -3400-5

\*\*\*\*\* INFORMATION FOR FIELD LABELED \*DSN SUFFIX\*

THE TAPE DSNNAME IS CONSTRUCTED AS FOLLOWS: THE FIRST INDEX IS 'FDRABR.' THE SECOND IS THE DISK SERIAL NUMBER PRECEDED BY A 'V' THEN THE THIRD IS FOUND UNDER DSN-SUFFIX EXAMPLE FOR DATA SET NAME AIRLIN.RATE.CONTROL.DATABASE (FDRABR.VID3330.B1803050)

\*\*\*CLUSTER - DEFINES A VSAM DFEF BASE CLUSTER FOLLOWED BY ITS ASSOCIATED COMPONENTS

\*\*\*\*\* INFORMATION FOR FIELD LABELED R/TRK\*

WHEN THE DATA IS FOLLOWED BY AN ASTERISK (\*).. THIS INDICATES THE FIELD VALUE IS THE RELATIVE TRACK ADDRESS OF THE BEGINNING OF THE DATA SET. WHEN THE ASTERISK IS NOT PRESENT THE VALUE IS THE NUMBER OF USED TRACKS (LAST BLOCK POINTER).

\*\*-- -- - -ALLOC TYPE- -- -- --\*

C - CYLINDER ALLOCATION  
T - TRACK ALLOCATION  
A - ABSOLUTE TRACK ALLOCATION

THIS REPORT PROVIDES THE A B R USER A LIST OF ALL DATA SETS THAT HAVE BEEN ARCHIVED FROM DASD STORAGE. THE REPORT ALSO FURNISHES THE USER A LIST OF TAPE VOLUME (S) THAT CONTAIN THE DATA SETS THAT HAVE BEEN ARCHIVED FORM DASD STORAGE DEVICES.

**53.06 CATALOG REPORT****REPORT  
SUMMARY**

The report generated by the PRINT CATLG Command gives the user a history of all ABR backup tape activity that is presently reflected by the user's catalog. The following information is made available to the user in printed format: DASD volume ID, generation and cycle number, type and date of backup, tape data set name, copy, file, and volume serial number(s).

**ISPF DIALOG  
OPTION**

ABR backup tape activity may be listed using the ISPF dialog support 'FDRABR Report Panel' option A.1. [Section 56.01](#) of this manual further explains this support.

**COMMAND  
FORMAT**

**PRINT**                    **CATLG**  
**P**                         **,BKDAYS=nn**  
                             **,FORMAT=PRT / CRT**  
                             **,LINECNT=nn**  
                             **,MAXCYC=nn**  
                             **,MAXGEN=nnnn**  
                             **,SELTERR=YES / NO**  
                             **,VOL=(vvvvvv,....,vvvvvv), | VOLG=(vvvvvv,....,vvvvvv)**

**OPERANDS**

**BKDAYS=**                Specifies the number of days that are to have passed since the most current backup was taken of the DASD volume, in order to generate the warning message FDR429 for entries found within the user's catalog.  
                             The default value is 7 days.

**FORMAT=**               Specifies that the report is to be prepared using other than the default selected by the program.  
                             PRT produces a 121 character line.  
                             CRT produces a 79 character line. (See report formats in [Section 53.04](#) for further explanation).

**LINECNT=**              Specifies the maximum number of lines each report page report can contain. The number can be any value from 10 to 99, inclusive.  
                             The default is each page will contain a maximum of 58 lines.

**MAXCYC=**               Specifies the number of cycles the user wishes to print within a single generation of ABR backup tapes. The order of selection will be the highest cycle number to the lowest number.  
                             The default is that ALL cycles will participate in data selection.

CONTINUED ...

53.06 CONTINUED ...

- MAXGEN=** Specifies the number of generations the user wants to print. Starting from the most current to the least current.  
The default is that ALL generations will participate in data selection.
- SELTERR=** **YES** – Specifies that a condition code of 12 will be set if there are no entries in the ABR backup catalog that match the selection criteria on this PRINT command.  
**NO** – Specifies that a condition code of 12 will not be set if there are no entries in the ABR backup catalog that match the selection criteria on this PRINT command.  
The default is YES.
- VOL=** Specifies string(s) from 1 to 6 characters in length. Only ABR backup catalog entries that match the selection criteria (i.e.: the compare length is six) will be selected for printing.  
The default is deferred to VOLG operand.
- VOLG=** Specifies string(s) from 1 to 6 characters in length. Only ABR backup catalog entries that match the selection criteria (i.e.: the compare length is the length of data specified) will be selected for printing.  
The default is that no check is made for volume ID if neither VOL nor VOLG is specified.  
NOTE: VOL and VOLG operands may be repeated and/or intermixed. A total of up to 100 strings may be specified.

CONTINUED ...

## 53.06 CONTINUED ...

VOLUME BACKUP REPORT ILLUSTRATION

FDR303

CARD IMAGE -

\*PRINT

CATLG

GENERATE VOLUME BACKUP REPORT

\*

FDDR400

AUTOMATIC BACKUP/RECOVERY REPORT -- FDRABRP VER4.8 -- INNOVATION DATA PROCESSINGDATA - 83.073

PAGE -1

## FDRABR VOLUME BACKUP REPORT

VOLSER	GEN	CYCLE	TYPE	DUMP	DATE	TAPE	FILE	DATA	SET	NAME	COPY	FILE	*- TAPE	VOLUME	SERIAL	NUMBER(S) --*	
ID2314	02	00	FDR		83.060	FDRABR.VID2314.C1000200	1	1			000402						
		00	FDR		83.060	FDRABR.VID2314.C2000200	2	1			000406						
		01		DAF	83.065	FDRABR.VID2314.C1000201	1	3			000403						
		02		DSF	83.070	FDRABR.VID2314.C1000202	1	6			000405						
	01	00	FDR		83.035	FDRABR.VID2314.C1000100	1	1			000399						
		00	FDR		83.035	FDRABR.VID2314.C2000100	2	1			000394						
		01		DSF	83.040	FDRABR.VID2314.C1000101	1	1			000398						
		02		DSF	83.045	FDRABR.VID2314.C1000102	1	2			000398						
		03		DSF	83.045	FDRABR.VID2314.C1000103	1	3			000398						
		04		DSF	83.055	FDRABR.VID2314.C1000104	1	4			000398						
		ID3330	02	00	FDR		83.060	FDRABR.VID3330.C1000200	1	1			000401				
			00	FDR		83.060	FDRABR.VID3330.C2000200	2	1			000407					
01			DSF	83.065	FDRABR.VID3330.C1000201	1	5			000403							
02			DSF	83.070	FDRABR.VID3330.C1000201	1	1			000404							
01	00		FDR		83.035	FDRABR.VID3330.C1000100	1	2			000399						
	00		FDR		83.035	FDRABR.VID3330.C2000100	2	1			000393						
01			DSF	83.040	FDRABR.VID3330.C1000101	1	1			000397							
02			DSF	83.045	FDRABR.VID3330.C1000102	1	2			000397							
ID3350	02	00	FDR		83.060	FDRABR.VID3350.C1000200	1	2			000402						
	00	FDR		83.060	FDRABR.VID3350.C2000200	2	1			000408							
	01		DSF	83.065	FDRABR.VID3350.C1000201	1	4			000403							
	02		DSF	83.070	FDRABR.VID3350.C1000202	1	3			000405							
01	00	FDR		83.035	FDRABR.VID3350.C1000100	1	3			000399.000396							
	00	FDR		83.035	FDRABR.VID3350.C2000100	2	1			000392							
	01		DSF	83.040	FDRABR.VID3350.C1000101	1	1			000395							
	02		DSF	83.045	FDRABR.VID3350.C1000102	1	2			000395							
	03		DSF	83.050	FDRABR.VID3350.C1000103	1	3			000395							
	04		DSF	83.055	FDRABR.VID3350.C1000104	1	4			000395							

FDR499 FDRABRP PROCESSING COMPLETE

THE ABOVE REPORT PROVIDES THE USERS WITH A B R BACKUP INFORMATION.  
 THIS LIST SEPARATES ALL DISK PACKS INTO GROUPS WHICH INCLUDE  
 ALL GENERATIONS AND CYLES KEPT IN THE ABR CVOL CATALOG FOR ALL  
 DISK PACK(S) INITIALIZED FDR ABR PROCESSING.  
 THIS GIVES THE USER A HARDCOPY OF BACKUP DATA SET NAMES AND THEIR  
 TAPE VOLUME SERIAL NUMBERS.

SAMPLE CATALOG REPORT FROM T S O  
 BROWSE - LED.RP105238.ABRMAP-----LINE 00000000 COL 001 080  
 COMMAND === > - SCROLL ==> CSB  
 VOLSER-IDPLB1 GENERATION--120 CYCLE ---00 BKPDT---89.251 TYPE DUMP---FDR  
 TAPE DSN-FDRABR.VIDPLB1.C1012000 COPY---1 FILE NO-----5  
 TAPE VOL-B80146.B80147.B80148.B80149.B80150  
 VOLSER-IDPLB1 GENERATION--120 CYCLE---00 BKPDT---89.251 TYPE DUMP---FDR  
 TAPE DSN-FDRABR.VI DLLB1.C2012000 COPY---2 FILE NO-----5  
 TAPE VOL-BV1032,BV1032,BV1032,BV1031, BV1030, BV1029  
 VOLSER-IDPLB1 GENERATION--120 CYCLE---01 BKPDT---89.254 TYPE DUMP---DSF  
 TAPE DSN-FDRABR.VIDPLB1.C1012001 COPY---1 FILE NO-----6  
 TAPE VOL-B80161  
 VOLSER-IDPLB1 GENERATION--120 CYCLE---02 BKPDT---89.255 TYPE DUMP---DSF  
 TAPE DSN-FDRABR.VIDPLB1.C1012002 COPY---1 FILE NO-----18  
 TAPE VOL-B80165  
 VOLSER-IDPLB1 GENERATION--19 CYCLE---00 BKPDT---89.244 YPE DUMP---FDR  
 TAPE DSN-FDRABR.VIDPLB1.C1011900 COPY---1 FILE NO-----5  
 TAPE VOL-B80111, B80113, B80114, B80115, B80116



53.07 SCRATCH REPORT

<b>REPORT SUMMARY</b>	The report generated by the PRINT SCRATCH Command gives the user critical information that has been captured by the ABR DADSM Pre-processing exit or the ABR SCRATCH exit in reference to data sets scratched from DASD storage by other than ARCHIVE functions. The following is made available to the user in printed format: Data set name, DASD volume ID and type, generation and cycle number, backup date, tape file number and volume serial number(s).	
<b>ISPF DIALOG OPTION</b>	Scratched data sets recorded by the ABR DADSM Pre-processing exit or the ABR SCRATCH exit may be listed using the ISPF dialog support 'FDRABR Report Panel' option A.1. <a href="#">Section 56.01</a> of this manual further explains this support.	
<b>ICF VSAM</b>	ICF VSAM files are reported by cluster name. The individual components are not recorded in the SCRATCH catalog.	
<b>COMMAND FORMAT</b>	<b>PRINT</b> <b>P</b>	<b>SCRATCH</b> <b>,DSN=(dsname,...,dsname),   DSG=(dsgrupp,...,dsgrupp)</b> <b>,FORMAT=PRT   CRT</b> <b>,LINECNT=nn</b> <b>,OLDBACKUP=CUR   ALL   (n..n)</b> <b>,SELTERR=<u>YES</u>   NO</b> <b>,VOL=(vvvvvv,...,vvvvv),   VOLG=(vvvvv,...,vvvvv)</b> <b>,XREF</b>
<b>OPERANDS</b>	<b>DSN=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only data sets having a name that matches the selection criteria (i.e.: compare length is 44) will be selected for printing.</p> <p>The default is deferred to the DSG= operand.</p>
	<b>DSG=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only data sets having a name that matches the selection criteria (i.e.: compare length is the length of the data specified) will be selected for printing.</p> <p>The default is that no check is made for data set name.</p> <p>NOTE: DSN and DSG operands may be repeated and/or intermixed. A total of up to 200 strings may be specified.</p>

CONTINUED . . .

## 53.07 CONTINUED . . .

<b>FORMAT=</b>	<p>Specifies that the report is to be prepared using other than the default selected by the program.</p> <p>PRT produces a 121 character line.</p> <p>CRT produces a 79 character line. (See report formats in <a href="#">Section 53.04</a> for further explanation).</p>
<b>LINECNT=</b>	<p>Specifies the maximum number of lines each report page can contain. The number can be any value from 10 to 99, inclusive.</p> <p>The default is each page will contain a maximum of 58 lines.</p>
<b>OLDBACKUP=</b> <b>OLDB=</b>	<p>Specifies the relative backup number(s) that is(are) to be printed when processing entries from the SCRATCH catalog.</p> <p><b>ALL</b> requests all backup tapes associated with the data set to be printed.</p> <p><b>CUR</b> requests the current backup tape only to be printed.</p> <p>A numeric value of 0 through 3 permits the user to select relative backup tapes for printing, where 0 is equal to current and 3 is equal to the oldest.</p> <p>The default is CUR.</p>
<b>SELTERR=</b>	<p><b>YES</b> – Specifies that a condition code of 12 will be set if there are no entries in the ABR SCRATCH catalog that match the selection criteria on this PRINT command.</p> <p><b>NO</b> – Specifies that a condition code of 12 will not be set if there are no entries in the ABR SCRATCH catalog that match the selection criteria on this PRINT command.</p> <p>The default is YES.</p>
<b>VOL=</b>	<p>Specifies string(s) from 1 to 6 characters in length. Only ABR SCRATCH catalog entries that match the selection criteria (i.e.: the compare length is the length of data specified) will be selected for printing.</p> <p>The default is deferred to VOLG operand.</p>
<b>VOLG=</b>	<p>Specifies string(s) from 1 to 6 characters in length. Only ABR SCRATCH catalog entries that match the selection criteria (i.e.: the compare length is the length of data specified) will be selected for printing.</p> <p>The default is that no check is made for volume ID if neither VOL nor VOLG is specified.</p> <p>NOTE: VOL and VOLG operands may be repeated and/or intermixed. A total of up to 100 strings may be specified.</p>
<b>XREF</b>	<p>Specifies that the report is to be printed showing recovery information by data set name. The recovery information includes the backup tape data set name, file number, and tape volume serial number(s), or, if applicable, cautions for any DASD data set that is not recoverable.</p> <p>The default is that only information for the data set is printed, excluding the backup tape information.</p>

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53.07 CONTINUED...

A B R S C R A T C H R E P O R T I L L U S T R A T I O N  
 FDR303 CARD IMAGE - \*PRINT SCRATCH,XREF,OLBACKUP=ALL GENERATE ABR SCRATCH REPORT \*

FDR400 AUTOMATIC BACKUP/RECOVERY REPORT -- FDRABRP VER 4.8 -- INNOVATION DATA PROCESSINGDATE - 83.336 PAGE - 1

FDRABR LIST OF SCRATCHED DATA SETS

***--DATA SET NAME--***	*--DISK SERIAL	VOLUME--* TYPE	SEQ	GEN	CYC	BK NO	BACKUP DATE	TAPE DSN SUFFIX	TAPE FILE	TAPE VOLUME(S)	REEQUIRED TO RESTORE
BILLING.FILE	ID3330	3330	001	1	4	00	82.300	C1000104	4	000397	
CICS.LOAD.V42	ID3330	3330	001	4	5	00	83.120	C1000405	1	100300	
								C2000405	1	100200	NOTE: DUPLICATE COPY
CUSTOMER.FILE	ID3350	3350	001	1	0	00	82.280	C1000100	3	100510,100511	
DFEFBASE.CLUSTER	ID3350	3350	001	1	0	00	82.280	C1000100	3	100510,100511	
IAM.LOAD.V3	ID2314	2314	001	2	0	00	82.305	C1000200	1	004402	
OPER1.CNTL	ID3375	3375	001	5	4	00	83.095	C1000504	1	000610	
				4	0	01	83.088	C1000400	1	000611	
				3	0	02	*****	C1000300		CAUTION -- OLD BKUP NOT CATALOGED	
				2	0	03	83.074	C1000200	1	000612	
OVERLOAD.FILE	ID2314	2314	001	1	0	00	82.280	C1000100	1	000399	
PAYROLL.TEST	ID2314	2314	001	1	2	00	82.290	C1000102	2	000398	
PAYROLL.SOURCE.LIB	ID3350	3350	001	55	7	00	83.180	C1005507	2	000395	
QUERY.FILE	ID3330	3330	001	2	6	00	82.305	C1000206	1	000401	
SCREEN.IMAGES	ID2314	2314	001	1	2	00	82.290	C1000102	2	000398	
SOFTWARE.PRODUCT.LIB	ID3350	3350	001	2	1	00	82.310	C1000201	4	000403	
SYSTEM.TIMINGS	ID3330	3330	001	2	0	00	82.305	C1000200	1	000401	
SYSTEM.RECOVERY	ID3350	3350	001	2	0	00	82.305	C1000200	2	000402	
SYS1.DUMP.UABEND	ID3350	3350	001	3		00	*****	C1000306		CAUTION -- CUR BKUP NOT CATALOGED	
SYS1.LINKLIB	ID2314	2314	001	10	5	00	83.095	C1001005	3	000398	
TRACER.FILE	ID3330	3330	001	2	1	00	82.310	C1000201	5	000403	
WATER.ANALYSIS	ID2314	2314	001	1	2	00	82.360	C1000102	2	000398	
WEATHER.RECORDS	ID3330	3330	001	1	3	00	82.295	C1000103	3	000397	

FDR499 FDRABRP PROCESSING COMPLETE

THE ABOVE REPORT PROVIDES THE A B R USERS, THAT HAVE THE I.D.P  
 S C R A T C H EXIT INSTALLED, WITH A LIST OF DATA SETS THAT  
 HAVE BEEN SCRATCHED FROM DASD STORAGE BY OTHER THAN OUR  
 A R C H I V E FUNCTION.

\*\*\*\*DFEF VSM WILL BE CAPTURED BY THE SCRATCH  
 EXIT. ONLY THE BASE CLUSTER WILL BE RECORDED  
 IN THE SCRATCH CATALOG FOR RESTORE PURPOSES.

S A M P L E S C R A T C H R E P O R T F R O M T S O

BROWSE - LED RP105238.ABRMAP-----LINE 0000011 COL 001 080  
 COMMAND ==>\_ SCROLL ==> CSB

DSN-IDP.MAIL.TRANLOG VOL-IDPLB1 3380 VSEQ---1  
 \*\*\*\*\*-----BACKUP INFORMATION-----\*\*\*\*\*  
 BDATE(100)-89.255 SFX-C1012002 FN-0018 VOLS-B80165

DSN-IDP.SYMAJM VOL-IDPLB2 3350 VSEQ---1  
 \*\*\*\*\*-----BACKUP INFORMATION-----\*\*\*\*\*  
 BDATE(00)-89.229 SFX-C1011904 FN-0046 VOLS-B80168  
 BDATE(01)-89.228 SFX-C1011903 FN-0034 VOLS-B80163  
 BDATE(02)-89.227 SFX-C1011902 FN0022 VOLS-B80143  
 BDATE(03)-89.223 SFX-C1011900 FN-0010 VOLS-B80130

DSN-IDP.SYMIAM6A VOL-IDPLB5 3380 VSEQ---1  
 \*\*\*\*\*-----BACKUP INFORMATION-----\*\*\*\*\*  
 BDATE(00)-89.236 SFX-C1008404 FN-0041 VOLS-B80224  
 BDATE(01)-89.235 SFX-C1008403 FN-0029 VOLS-B80221  
 BDATE(02)-89.234 SFX-C1008402 FN-0017 VOLS-B80216  
 BDATE(03)-89.230 SFX-C1008400 FN-0004 VOLS-B80176,B80181,B80196

**53.08 VOLUME STATUS REPORT**

<b>REPORT SUMMARY</b>	The report generated by the PRINT VOLSTAT command gives the user current information related to ABR processing for some or all of the DASD volumes online at the time of execution. The following information is made available to the user in printed format: DASD volume ID, last backup date, current generation and cycle number, tape retention period, type of backup last processed, expiration date of the current generation, and informative messages.	
<b>ISPF DIALOG OPTION</b>	Information from the ABR model may be listed using the ISPF dialog support 'FDRABR Report Panel' option A.1. <a href="#">Section 56.01</a> of this manual further explains this support.	
<b>JCL NOTES</b>	Additional DASD volumes that are NOT always online to the system can be accessed by including DISKxxxx DD statements. For a further explanation see the Job Control Requirement Section.	
<b>COMMAND FORMAT</b>	<b>PRINT</b> <b>P</b>	<b>VOLSTAT</b> <b>,BKDAYS=nnn</b> <b>,FORMAT=PRT   CRT</b> <b>,INFO=YES   NO</b> <b>,LINECNT=nn</b> <b>,SELTERR=YES   NO</b> <b>,VOL=(vvvvvv,...,vvvvvv),   VOLG=(vvvvv,...,vvvvv)</b>
<b>OPERANDS</b>	<b>BKDAYS=</b>	Specifies the number of days that are to have passed since the most current backup of a volume was taken, in order to generate a warning message indicating that the volume has not been backed up recently or that the backup will expire within this number of days.  The default value is 7 days.
	<b>FORMAT=</b>	Specifies that the report is to be prepared using other than the default selected by the program.  PRT produces a 121 character line.  CRT produces a 79 character line. (See report formats in <a href="#">Section 53.04</a> for further explanation).
	<b>INFO=</b>	<b>NO</b> – specifies that ABR is not to print the information messages for the volumes being selected. Example of an information message is an indication of whether the volume is enabled for ARCHIVE or SUPERSCRATCH.  Default is YES, all information messages are printed.

CONTINUED . . .

## 53.08 CONTINUED . . .

**LINECNT=** Specifies the maximum number of lines each report page can contain. The number can be any value from 10 to 99, inclusive.  
The default is each page will contain a maximum of 58 lines.

**SELTERR=** **YES** – Specifies that a condition code of 12 will be set if there are no online volumes that match the selection criteria on this PRINT command.  
**NO** – Specifies that a condition code of 12 will not be set if there are no online volumes that match the selection criteria on this PRINT command.  
The default is YES.

**VOL=** Specifies string(s) from 1 to 6 characters in length. All volumes online to the system that match the selection criteria (i.e.: the compare length is six) will be selected for printing.  
The default is deferred to VOLG operand.

**VOLG=** Specifies string(s) from 1 to 6 characters in length. All volumes online to the system that match the selection criteria (i.e.: the compare length is the length of data specified) will be selected for printing.  
The default is that all volumes ONLINE will be processed unless specific selection criteria is used.

NOTE: VOL and VOLG operands may be repeated and/or intermixed. A total of up to 100 strings may be specified.

CONTINUED . . .

## VOLUME STATUS REPORT

53.08

53.08 CONTINUED ...

V O L U M E S T A T U S R E P O R T I L L U S T R A T I O N

FDR303 CARD IMAGE - \*PRINT VOLSTAT GENERATE VOLUME STATUS REPORT \*

FDR400 FDRABR VOLUME STATUS UTILITY --FDRABRVC VER 4.8 -- INNOVATION DATA PROCESSING DAT - 83.049 PAGE - 0001

VOLUME	LAST BACKUP	MAXIMUM	CURRENT	AUTO RET	CUR GEN				
SERIAL	DATE	TYPE	GEN	CYC	GEN	CYC	CYC PER	EXPIRES	COMMENTS
ID2314	83.010	DSF	4	10	2	3	3 30	83.030	*** WARNING -- LAST BACKUP FOR THIS VOLUME HAS EXPIRED ** 39 DAYS SINCE VOLUME PROCESSED BY ABR ***
ID3330	83.045	FDR	5	5	4	0	0 90	83.135	
ID3350	83.049	DSF	5	5	4	3	3 60	83.135	
SP00L1									*** WARNING -- VOLUME NOT INITIALIZED FOR ABR PROCESS ***
ID3375	83.049	DSF	5	5	4	3	2 60	83.135	
ID3380	83.030	FDR	4	10	3	0	0 30	83.055	*** WARNING -- CURRENT BACKUP WILL EXPIRE IN 6 DAYS *** * INFO ONLY ARCHIVE FUNCTION DISABLED FOR THE VOLUME *
WORK01	83.001	INIT	4	10	0	63	63 60		*** WARNING -- VOLUME INITIALIZED BUT NEVER PROCESSED ***
FDR499	FDRABRVC	PROCESSING COMPLETE							*** INFORMATION FOR FIELDS LABELED: *CURRENT CEN/CYC* AUTO CYC* GEN -- CURRENT GENERATION NUMBER CURRENT CYCLE FOR CYC -- CURRENT CYCLE NUMBER TYPE=AUTO

THE ABOVE REPORT PROVIDES THE USER WITH A B R BACKUP STATUS  
INFORMATION FOR ALL DISK SPINDLES THATT ARE ONLINE TO THE SYSTEM  
AT THE TIME THIS FUNCTION IS EXECUTED BY THE USER.

V O L U M E S T A T U S T S O I L L U S T R A T I O N

VOLSER---ID3375

LAST ABR DATE -83.049 RET PERION - 60 MAX GEN- - 5 MAX CYCLE - - - 5  
BACKUP EXPIRES -83.135 BKUP TYPE - DSF CUR GEN- - 4 CUR CYCLE - - 3/02

VOLSER---ID3380

LAST ABR DATE -83.030 RET PERIOD - 30 MAX GEN- - 4 MAX CYCLE - - -10  
BACKUP EXPIRES -83.055 BKUP TYPE - FDR CUR GEN- - 3 CUR CYCLE - - 0/00  
STATUS---\*\*\*WARNING -- CURRENT BACKUP WILL EXPIRE IN 6 DAYS\*\*\*  
STATUS---\* INFO ONLY -- ARCHIVE FUNCTION DISABLED FOR THE VOLUME \*

VOLSER---WORK01

LAST ABR DATE -83.001 RET PERIOD - 60 MAX GEN- - 4 MAX CYCLE - - -10  
BACKUP EXPIRES - - - - BKUP TYPE - INIT CUR GEN- - 0 CUR CYCLE - 63/63  
STATUS---\*\*\* WARNING -- VOLUME INITIALIZED BUT NERVER PROCESSED \*\*\*

VOLSER---SP00L1

STATUS--- WARNING -- VOLUME NOT INITIALIZED FOR ABR PROCESS \*\*\*

FDR499 FDRABRVC PRESSING COMPLETED

\*\*\*\* INFORMATION FOR FIELD LABELED \*CUR CYCLE---CC/CC\*  
FIRST 'CC' VALUE IS CURRENT CYCLE NUMBER  
SECOND 'CC' VALUE IS CURRENT CYCLE FOR TYPE=AUTO

**53.09 VTOC REPORT**

**REPORT SUMMARY** The report generated by the Print VTOC command gives the user current information from the DSCBS-related to the volume referenced by a DISKxxxx DD statement or the VOL(G) operand. The following information is made available to the user in printed format: data set name, DASD volume ID, last ABR cycle, volume sequence number, last reference date, special ABR indicators, data set attributes and allocation information. The BACKUP (XREF) option is detailed in [Section 53.11](#).

**ICF VSAM** ABR will report and select ICF VSAM files by cluster name. The individual components for a cluster will be reported following the cluster name. A STEPCAT may be required for this report if the VSAM files are not aliased in the master catalog.

NOTE: Extensive VSAM reporting is available thru program FDREPORT. [See Section 53.20](#).

<b>COMMAND FORMAT</b>	<b>PRINT P</b>	<b>VTOC  ,AGE=nnn  ,AGEINC=nnn  ,COMBINE  ,DETAIL=<u>YES</u> / NO  ,DSN=(dsname,...,dsname)   ,DSG=(dsgrupp,...,dsgrupp)  ,FORMAT=PRT   CRT  ,LINECNT=nn  ,ONLINE  ,SELTERR=<u>YES</u> / NO  ,SUM=<u>YES</u> / NO  ,VOL=(vvvvvv,...,vvvvvv)   ,VOLG=(vvvvv,...,vvvvv)</b>
---------------------------	--------------------	---

CONTINUED . . .

## 53.09 CONTINUED . . .

<b>OPERANDS</b>	<b>AGE=</b>	<p>If the summary report is printed, AGE= will specify the number of days since a data set has been referenced as used by the aging summary for the VTOC Report. The number may be from 1 to 999 inclusive.</p> <p>The default is 30.</p>
	<b>AGEINC=</b>	<p>If the summary report is printed, AGEINC= will specify the number of days added to the value to derive the next control break in the aging summary for the VTOC Report. The summary report will display four aging breaks. The number may be from 1 to 999 inclusive.</p> <p>The default is 30.</p>
	<b>COMBINE</b>	<p>Specifies that the report will be produced in data set/volume serial number sequence, merging the various disk volumes into one combined report.</p> <p>NOTE: The use of COMBINE requires that the execution Job Control include SORT-related DD statements (i.e.: SORTLIB, SORTWK01, ..., SORTWKnn, SYSOUT, etc.).</p> <p>The default is that each volume processed will have its own separate report.</p>
	<b>DETAIL=</b>	<p><b>NO</b> – results in ONLY a track utilization and data set aging summary to be printed. The SUM=YES option must also be active otherwise no reports will be output. The reporting of DSCB's information related to each data set is bypassed.</p> <p>The default is DETAIL=YES.</p>
	<b>DSN=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only data sets or VSAM clusters having a name that matches the selection criteria (i.e.: compare length is 44) are selected from the VTOC for printing.</p> <p>The default is deferred to the DSG operand.</p>
	<b>DSG=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only data sets or VSAM clusters having a name that matches the selection criteria (i.e.: compare length is the length of the data specified) are selected from the VTOC for printing.</p> <p>There is a special form of the DSG operand. Leading periods(.) after DSG= indicate that the group name starts after one or more index levels. Each period indicates that one (1) index level is to be bypassed.</p> <p>The default is that all data sets within each processed VTOC are printed.</p> <p>NOTE: DSN and DSG operands can be repeated and/or intermixed. A total of up to 200 strings can be specified.</p>
	<b>FORMAT=</b>	<p>Specifies that the report is to be prepared using other than the default selected by the program.</p> <p>PRT produces a 121 character line.</p> <p>CRT produces a 79 character line. (See report formats in <a href="#">Section 53.04</a> for further explanation).</p>
	<b>LINECNT=</b>	<p>Specifies the maximum number of lines each report page can contain. The number can be any value from 28 to 99 inclusive.</p> <p>The default is each page will contain a maximum of 58 lines.</p>

CONTINUED . . .



## 53.09 CONTINUED . . .

- ONLINE** The report facility normally will only process volumes specified by DISK(xxxx) DD statements. This function causes a scan for any volume(s) that is (are) online to the system. These volumes will be appended to the normal DISK(xxxx) volume list, if any.
- NOTE: Non-MVS systems – ONLINE is NOT supported. Selection is based on the DISK(xxxx) DD statements.
- SELTERR=** **YES** – Specifies that a condition code of 12 will be set if there are no data sets that match the selection criteria on this PRINT command.
- NO** – Specifies that a condition code of 12 will not be set if there are no data sets that match the selection criteria on this PRINT command.
- The default is YES.
- SUM=** NO results in the track utilization and data set aging summary to be bypassed. Only the information from the DSCBs for the data set(s) on the volume(s) selected will be printed. The user must insure that the DETAIL=YES option is active.
- The default is SUM=YES.
- VOL=** Specifies string(s) from 1 to 6 characters in length. All volumes online to the system that match the selection criteria (i.e.: the compare length is six) will be selected for printing.
- The default is deferred to VOLG operand.
- VOLG=** Specifies string(s) from 1 to 6 characters in length. All volumes online to the system that match the selection criteria (i.e.: the compare length is the length of data specified) will be selected for printing.
- The default, if neither VOL nor VOLG is specified, is that all volumes specified by DISK(xxxx) DD statements will be processed, plus all online volumes if ONLINE is specified.
- NOTE: VOL and VOLG operands may be repeated and/or intermixed. A total of up to 100 strings may be specified. On MVS systems, ABR will dynamically allocate this disk volume if a DISK(xxxx) DD statement is not specified.

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53.09 CONTINUED ...

## V T O C   D A T A   S E T   R E P O R T   I L L U S T R A T I O N

FDR303   CARD IMAGE - \*PRINT   VTOC   GENERATE VOLUME REPORT   \*

FDR400   AUTOMATIC BACKUP/RICOVERY VTOC LIST -- FDRABRV VER 5.0 -- INNOVATION DATA PROCESSING DATE - 85.286PAGE - 001

VTOC LIST OF VOLUME SERIAL NUMBER WORK10 - DEVICE TYPE 3330

DATA SET NAME	VOLUME SERIAL	LS CY	VOL SEQ	LAST REF DATE	ABR IND	D/S ORG	BLOCK RECFM	SIZE	LRECL	TRACKS ALLOC	FREE	EXTENT CT	DESCRIPTORS CCC-HH	CCC-HH
----	-----	----	-----	-----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----
****VTOC	WORK10		001							19	0	1	0201-00	0201-18
***ABR MODEL--LAST GEN=0004	WORK10	02	001	85.285		<--NOTE:DATE OF MOST CURRENT BACKUP								
FDRABR.VWORK10														
ANSWER.FILE	WORK10	00	001	85.255	N	IS	FB	400	80	19	0	1	0013-00	0013-18
CICS.IAM.FILE	WDRK10	02	001	85.286	NU	DA	F	9442	0	38	0	1	0350-00	0351-18
CUSTOMER.INFO.VSAM	WORK10	02	001	85.280	A	AM	U	4096	0	114	0	1	0260-00	0265-18
FAST.ANALYSIS.OF.TAPE.AND RECOVERY	WORK10	01	001	85.285		POU	U	1000	100	3	10	1	0401-05	0401-07
FDRABR.ARCHIVE	WORK10	02	001	85.286	U	DA	F	6432	0	16	0	1	0175-00	0175-15
IAM.FAST.FILE	WORK10	00	001	85.298	N	DA	F	12960	0	1900	0	1	0300-00	0399-18
IDP.MODEL.ISAM	WORK10		001	00.000	CU	IS	FB	800	80	0	0	0		
IDP.MODEL.PSAM	WORK10		001	00.000	CU	PS	FB	1500	150	0	0	0		
IDP.PSFILE	WORK10	00	001	85.286	CU	PS	F	125	125	3	0	3	0014-01	0014-01
													0010-01	0010-01
													0037-15	0037-15
***CLUSTER---LOAN.MASTER.FILE														
LOAN.DATA	WORK10	00	001	85.286		EF	U	4096	0	36	0	1	0180-02	0181-18
LOAN.INDEX	WORK10	00	001	85.286		EF	U	4096	0	2	0	1	0180-00	0180-01
LOAN.INDEXAIX.DATA	WORK10	00	001	85.286		EF	U	4096	0	4	0	1	0182-01	0182-04
LOAN.INDEXAIX.INDEX	WORK10	00	001	85.286		EF	U	4096	0	1	0	1	0182-00	0182-00
LIFE.INSURE	WORK10	02	001	84.320	M	**	**	0	0	57	0	1	0310-01	0310-00
													0310-01	0312-18
MASTER.IAM.FILE1	WORK10	02	001	85.253		DA	F	6400	0	9	0	1	0097-00	0097-08
MASTER.IAM.FILE2	WORK10	02	001	85.242		DA	F	6400	0	9	0	1	0097-09	0097-17
MASTER.ISAM.FILE	WORK10	00	001	84.315	X	IS	VB	1004	100	209	0	3	0105-00	0106-18
													0098-00	0104-18
													0107-00	0108-18
PAYROLL.DISK2	WORK10	02	002	85.265	A	IS	FB	2000	500	57	0	2	0161-00	0162-18
													0163-00	0163-18
SCYSCTLG	WORK10	01	001	85.268		**	F	256	0	95	0	1	0220-00	0224-18
SYS1.COBLIB	WORK10	00	001	85.256	N	PO	U	1906	0	19	13	1	0269-00	0269-18
SYS1.MANX	WORK10	02	001	85.286	NU	PS	VBS	1000	1000	38	21	1	0051-00	0052-18
SYS1.MANY	WORK10	02	001	85.286	NU	PS	VBS	1000	1000	38	3	1	0053-00	0054-18

\*\*\*\*\*EXPLANATION OF FIELD LABELED \*ABR IND\*

A=ALWAYS BACKUP/NEVER ARCHIVE

C=NO CURRENT BACKUP

N=NORMAL BACKUP/

R=ARCHIVING REQUESTED

U=UPDATE INDICATED

X=EXCLUDE FROM ABR PROCESSING

Z=ABR INDICATORS CONTAMINATED

FIELD LABELED \*LS CY\*

THIS FIELD INDICATES THE LAST ABR CYCLE THAT THIS DATA

SET WAS BACKUP ON WITHIN THE GEN SPECIFIED BY THE ABR MODEL.

NEVER ARCHIVEFIELD LABEL \*EXTENT CT\*

THE DATA FOUND UNDER \*CT\* INDICATES THE NUMBER

OF EXTENTS BELONGING TO THE DATA SET.

\*\*\*CLUSTER - DEFINES A ICF VSAM BASE CLUSTER

FOLLOWED BY ITS ASSOCIATED COMPONENTS

## VTOC SUMMARY REPORT

IN SUMMARY - VOLUME WORK10 --- DEVICE TYPE 3330

\*\*\*TRACK UTILIZATION \*\*\* PER \*\*\* DATA SET STATISTICS \*\*\*

TOTAL TRACKS - - - 7676

ALLOCATED TRACKS - 7252

PS/PO ALLOCATED - 6482

PS/PO USED - - - 3390

PS/PO UNUSED - - - 3092

OTHER ALLOCATED - - 769

FREE TRACKS - - - - 424

95% TOTAL DATA SETS- - - - 42

PS/PO DATA SETS - - - 34

47% OTHER DATA SETS - - - - 8

5% TOTAL EXTENTS- - - - - 44

\*\*\* DATE SET AGING SUMMARY --- BASED ON LAST REFERENCED DATA \*\*

LRDATE	DAYS SINCE REFERENCED	DATA SETS	ALLOC TRACKS	USED TRACKS	UNUSED TRACKS
--------	-----------------------	-----------	--------------	-------------	---------------

85.256	1 - 30	23	2955	1509	1446
--------	--------	----	------	------	------

85.226	31 - 60	1	114	32	82
--------	---------	---	-----	----	----

85.196	61 - 90	6	2222	1126	1096
--------	---------	---	------	------	------

** ***	91 - ***	12	1960	1492	468
--------	----------	----	------	------	-----

WASTED SPACE WITHIN  
PS/PO DATA SETSFREE SPACE  
ON VOLUMEAGING  
REPORTS

FDR 426 PROCESSING OF VOLUME WORK10 COMPLETED

## 53.10 TAPE VTOC REPORT

**REPORT SUMMARY** The report generated by the PRINT TVTOC command gives the user access to VTOC information and/or VVDS information from the control records at the beginning of a dump tape created by FDR, FDRDSF, or FDRABR. The type of report is selected by using the LIST= and/or VSAM= operands.

**JCL NOTES** The input tape is identified by a DD statement with a DDNAME prefixed by 'TAPE'. If multiple TAPExxxx DD statements are present, all of them will be processed, unless FRDD= is specified. A VSAMPRT SYSOUT DD statement is required if you wish to generate a listing of the VVDS information.

**COMMAND FORMAT**

```

PRINT          TVTOC
P              ,DSN=(dsname,...,dsname) | ,DSG=(dsgroup,...,dsgroup)
                  ,FRDD=c.....c
                  ,LINECNT=nn
                  ,LIST=ABR | VTOC | DUMP | NO
                  ,SELTERR=YES | NO
                  ,VSAM=YES | NO | DUMP

```

**OPERANDS**

**DSN=** Specifies one or more data sets that are to be selected for the report. Each name may be from 1 to 44 characters long.

If the name is the name of a component of an ICF VSAM data set, and a VVDS report is produced, then all components of the data set will be included in both the VTOC and VVDS report.

The default, if neither DSN= nor DSG= is specified, is that all data sets that were backed up to this tape file will be included in the report.

**DSG=** Specifies one or more group names of data sets that are to be selected for the report. Each group name may be from 1 to 44 characters long. All data sets that have names starting with these characters will be selected.

If the name is the name of a component of an ICF VSAM data set, and a VVDS report is produced, then all components of the data set will be included in both the VTOC and VVDS report.

There is a special form of the DSG= operand. Leading periods (.) after DSG= indicate the group name starts after one or more index levels. Each period indicates that one index level is to be bypassed.

The default, if neither DSN= nor DSG= is specified, is that all data sets that were backed up to this tape file will be included in the report.

NOTE: DSN= and DSG= operands may be repeated and/or intermixed. A total of up to 200 strings may be specified.

CONTINUED . . .

## 53.10 CONTINUED . . .

- FRDD=** Specifies the name of the DD statement to use when reading the input tape. This allows a selective execution when the JCL contains multiple TAPExxxx DD statements.  
The default is that all TAPExxxx DD statements will be processed.
- LINECNT=** Specifies the maximum number of lines each report page can contain. The number can be any value from 28 to 99, inclusive.  
The default is that each page will contain a maximum of 58 lines.
- LIST=** Specifies the format of the listing of VTOC information.  
**ABR** – Specifies that the listing of VTOC information will be in a format similar to that of program FDRABRP, command PRINT VTOC, FORMAT=PRT.  
**VTOC** – Specifies that the listing of VTOC information will be in a format similar to that of program IEHLIST, command LISTVTOC FORMAT.  
**DUMP** – Specifies that the listing of VTOC information will be in a format similar to that of program IEHLIST, command LISTVTOC DUMP.  
**NO** – Specifies that NO listing of VTOC information will be produced.  
 Default is LIST=ABR.
- SELTERR=** **YES** – Specifies that a condition code of 12 will be set if there are no data sets backed up to the tapes being processed that match the selection criteria on this PRINT command.  
**NO** – Specifies that a condition code of 12 will not be set if there are no data sets backed up to the tapes being processed that match the selection criteria on this PRINT command.  
 The default is YES.
- VSAM=** Specifies the format of the listing of VVDS information for ICF VSAM data sets. VSAMPRT must be present if this option is specified as other than NO.  
**YES** – Specifies that the listing of VVDS information will be in a format similar to that of program IDCAMS, command LISTCAT ALL. ABR will fill in as much of this report as is possible from the BACKUP. Some fields, such as Paths for alternate indexes and password protection, are not available from the backup tape.  
**DUMP** – Specifies that the listing of VVDS information will be in the format of a dump of each VVR, with hexadecimal on the left and EBCDIC on the right.  
**NO** – Specifies that NO listing of VVDS information will be produced.  
 The default is VSAM=YES if VSAMPRT is present, VSAM=NO if not.

**53.11 DATA SET BACKUP REPORT**

**REPORT SUMMARY** The report generated by the PRINT BACKUP command gives the user backup information from the DSCBs related to the volume referenced by a DISKxxxx DD statement. The following information is made available to the user in printed format: data set name, DASD volume ID, volume sequence number, last reference date, data set attributes and allocation information. ABR also displays the backup date and volumes used. If OLDBACKUP is ENABLED for the volume, ABR will optionally print previous backup information.

**ISPF DIALOG OPTION** Information detailing the backup history of data sets may be listed using the ISPF dialog support 'FDRABR Report Panel' option A.1. [Section 56.01](#) of this manual further explains this support.

**ICF VSAM** ABR will report and select ICF VSAM files by cluster name. The individual components for a cluster will be reported following the cluster name. A STEPCAT may be required for this report if the VSAM files are not aliased in the master catalog.

<b>COMMAND FORMAT</b>	<b>PRINT P</b>	<b>BACKUP ,COMBINE  ,DSN=(dsname,...,dsname)   ,DSG=(dsgrupp,...,dsgrupp) ,FORMAT=PRT   CRT ,LINECNT=nn ,OLDBACKUP=CUR   ALL   (n...n) ,ONLINE ,SELTERR=<u>YES</u>   NO ,VOL=(vvvvvv,...,vvvvvv)   ,VOLG=(vvvvvv,...,vvvvvv)</b>
---------------------------	--------------------	--

CONTINUED . . .

## 53.11 CONTINUED . . .

<b>OPERANDS COMBINE</b>	<p>Specifies that the report will be produced in data set/volume serial number sequence, merging the various disk volumes into one (1) combined report.</p> <p>NOTE: The use of COMBINE REQUIRES that the execution Job Control include SORT-related DD statements (i.e.: SORTLIB, SORTWK01, ..., SORTWKnn, SYSOUT, etc.).</p> <p>The default is that each volume processed will have its own separate report.</p>
<b>DSN=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only data sets or VSAM clusters having a name that matches the selection criteria (i.e.: compare length is 44) are selected from the VTOC for printing.</p> <p>The default is deferred to the DSG operand.</p>
<b>DSG=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only data sets or VSAM clusters having a name that matches the selection criteria (i.e.: compare length is the length of the data specified) are selected from the VTOC for printing.</p> <p>There is a special form of the DSG operand. Leading periods (.) after DSG= indicate that the group name starts after one or more index levels. Each period indicates that one (1) index level is to be bypassed.</p> <p>The default is that all data sets within each processed VTOC are printed.</p> <p>NOTE: DSN and DSG operands can be repeated and/or intermixed. A total of up to 200 strings can be specified.</p>
<b>FORMAT=</b>	<p>Specifies that the report is to be prepared using other than the default selected by the program.</p> <p>PRT produces a 121 character line.</p> <p>CRT produces a 79 character line. (See report formats in <a href="#">Section 53.04</a> for further explanation).</p>
<b>LINECNT=</b>	<p>Specifies the maximum number of lines each report page can contain. The number can be any value from 28 to 99 inclusive.</p> <p>The default is each page will contain a maximum of 58 lines.</p>
<b>OLDBACKUP=</b>	
<b>OLDB=</b>	<p>Specifies the relative oldbackup number(s) that is(are) to be printed.</p> <p><b>ALL</b> requests all backup tapes associated with the data set is to be printed.</p> <p><b>CUR</b> requests that only the current backup tape information is to be printed. A numeric value of 0 through 13 permits the user to select relative backup tapes for printing. Where 0 is equal to current and 13 is equal to the oldest.</p> <p>The default is 'CUR'.</p>
<b>ONLINE</b>	<p>The report facility normally will only process volumes specified by DISK(xxxx) DD statements. This function causes a scan for any volume(s) that is(are) online to the system. These volumes will be appended to the normal DISK(xxxx) volume list, if any.</p> <p>NOTE: Non-MVS systems – ONLINE is NOT supported. Selection is based on DISK(xxxx) DD statements and VOL/VOLG operands.</p>

CONTINUED . . .

## 53.11 CONTINUED . . .

- SELTERR=**      **YES** – Specifies that a condition code of 12 will be set if there are no data sets that match the selection criteria on this PRINT command.
- NO** – Specifies that a condition code of 12 will not be set if there are no data sets that match the selection criteria on this PRINT command.
- The default is YES.
- VOL=**            Specifies string(s) from 1 to 6 characters in length. All volumes online to the system that match the selection criteria (i.e.: the compare length is six) will be selected for printing.
- The default is deferred to VOLG operand.
- VOLG=**          Specifies string(s) from 1 to 6 characters in length. All volumes online to the system that matches the selection criteria (i.e.: the compare length is the length of data specified) will be selected for printing.
- The default, if neither VOL nor VOLG is specified, is that all volumes specified by DISK(xxxx) DD statements will be processed, plus all online volumes if ONLINE is specified.
- NOTE: VOL and VOLG operands may be repeated and/or intermixed. A total of up to 100 strings may be specified. On MVS systems, ABR will dynamically allocate this disk volume if a DISK(xxxx) DD statement is not specified.

CONTINUED . . .

## DATA SET BACKUP REPORT

53.11

53.11 CONTINUED ...

## V T O C X R E F D A T A S E T R E P O R T

FDR303 CARD IMAGE - \*PRINT BACKUP, COMBINE, OLDBACKUP=ALLGENERATE VTOC REPORT \*

FDR4000 AUTOMATIC BACKUP/RECOVERY VTOC LIST -- FDRABRV VER 4.8 -- INNOVATION DATA PROCESSING DATA - 84.030 PAGE - 001  
COMBINED DSNAME/TAPE XREF LIST

DATA SET NAME	VOLUME	VL	D/S	TRACKS	LS REF	BACKUP	BK	TAPEDSN	TAP	TAPEVOLUME(S)	REQUIRED TO RESTORE
SERIAL	SQ	ORG	ALLOC	FREE	DATE	DATE	NO	SUFFIX	FIL		
ANSWER.FILE	ID3330	01	IS	1900	0	84.029	84.028	00	C1000200	001	000401,010010,200556,412100
						*****					OLD BACKUP INFORMATION NOT ENABLED
CICS.IAM.FILE	ID3350	01	DA	90	0	84.030*	84.028	00	C1000202	003	000405
							84.027	01	C1000200	001	000407,000499
							84.025	02	C1000105	003	001008
FAST.ANALYSIS.OF.TAPE.AND. RECOVERY	ID3330	01	POU	3	1	84.002	84.020	00	C1000201	005	000403
						*****					OLD BACKUP INFORMATION NOT ENABLED
FDRABR.ARCHIVE	ID2314	01	DA	20	0	84.030*	84.029	00	C1005009	006	000405
						*****					OLD BACKUP INFORMATION NOT ENABLED
IAM.FAST.FILE	ID3350	01	DA	3000	0	84.019	84.020	00	C1000200	002	000402
IDP.MODEL.ISAM	ID3330	01	IS	0	0	00.000*	*****				CAUTION -- NO CURRENT BACKUP TAPE
IDP.PSFILE	ID2314	01	PS	3	0	84.030*	*****				CAUTION -- NO CURRENT BACKUP TAPE
LIFE.INSURE	ID3350	01	**	90	0	84.001	84.028	00	C1000202	003	000405
						*****					OLD BACKUP INFORMATION NOT ENABLED
MASTER.IAM.FILE1	ID3330	01	DA	9	0	84.030	84.030	00	C1000202	001	000404
							84.029	01	C1000201	001	000408
MASTER.IAM.FILE2	ID3330	01	DA	9	0	84.029	84.028	00	C1000202	001	000404
							84.029	01	C1000201	001	000408
***CLUSTER---PAYROLL.MASTER.FI983											
PAYROLL.DATA	ID3375	01	EF	90	0	84.030	84.030	00	C1000602	001	000500
PAYROLL.INDEX	ID3375	01	EF	05	0	84.030	84.030	00	C1000602	001	000500
SYS1.LINKLIB	ID3330	01	PO	551	3	84.030	84.027	00	C1000202	001	000404
						*****					OLD BACKUP INFORMATION NOT ENABLED
TSO.FILE	ID3350	01	PS	120	40	84.030*	84.029	00	C1000201	004	000403
							84.027	01	C1000200	001	900008
T73E2F00.VSAMDSSET.DFD79340.	ID3350	01	AM	600	0	84.030	84.029	00	C1000200	002	000409
TIF60C4A.T73E2F00						*****					OLD BACKUP INFORMATION NOT ENABLED

FDR499 FDRABRV PROCESSING COMPLETE

\*\*\*\*\* INFORMATION FOR FIELD LABELED \*LS REF DATE\*  
WHEN AN ASTERISK (\*) IS PRINTED AFTER LAST  
REFERENCE DATE THE DATA SET HAS BEEN  
UPDATED SINCE LAST BACKUP

FIELD LABELED \*TAPE DSN SUFFIX\*  
THE BACKUP TAPE DSNAME IS CONSTRUCTED AS FOLLOWS:  
THE FIRST INDEX IS 'FDRABR.' THE SECOND IS THE DISK  
SERIAL NUMBER PRECEDED BY A 'V' THEN THE THIRD IS  
FOUND UNDER \*TAPE DSN SUFFIX\*.  
EXAMPLE FOR DAT SET NAME 'ANSWER. FILE'  
(FDRABR.VID3330.C1000200)

\*\*\*CLUSTER - DEFINES A VSAM DFEF BASE CLUSTER  
FOLLOWED BY ITS ASSOCIATED COMPONENTS

THE ABOVE REPORT PROVIDES THE ABR USER WITH A LIST DETAILING  
THE LOCATION (TAPE VOLUME(S), FILE NUMBER ) OF THE M O S T CURRENT  
BACKUP DATA FOR THE DATA SET(S) NAMES PRINTED.

NOTE: Information for field labeled BK NO:

This field indicates the relative backup number to be used with the operand OLDBACKUP.

BK NO

0 - Zero indicates the current backup.

1 - One indicates the minus one backup.

... to ...

13 - Thirteen indicates the minus thirteen backup.



## 53.12 VTOC REPORT BY DATA SET INDEX

**REPORT  
SUMMARY**

Two reports are generated by the PRINT VTOC,SUMPFX command giving the user current information from the DSCBs related to the volume referenced by a DISKxxxx DD statement. The first is the normally printed VTOC report unless DETAIL=NO is specified. The second is the summary by (INDEX)USERID. The following information is made available to the user in printed format: data set ID(INDEX),DEVTYPE, total number of data sets, extents and tracks owned by the ID. This report also details the number of data sets owned by data set organization and aging statistics.

**This report will be printed on the ABRSUM DD statement.**

**COMMAND  
FORMAT**

**PRINT**            **VTOC**  
**P**                    **,SUMPFX=YES | ALL**  
                      **,AGE=nn**  
                      **,AGEINC=nnn**  
                      **,COMBINE**  
                      **,DETAIL=YES | NO**  
                      **,DSN=(dsname,...,dsname) | ,DSG=(dsgrout,...,dsgrout)**  
                      **,FORMAT=PRT | CRT**  
                      **,LINECNT=nn**  
                      **,ONLINE**  
                      **,SELTERR=YES | NO**  
                      **,SUM=YES | NO**  
                      **,VOL=(vvvvvv,...,vvvvvv) | ,VOLG=(vvvvv,...,vvvvv)**

CONTINUED . . .

## 53.12 CONTINUED . . .

<b>OPERANDS</b>	<b>SUMPFX=</b>	<p>Specifies that the report will be by data set index.</p> <p><b>YES</b> will produce only a report by index level.</p> <p><b>ALL</b> causes ABR to also produce AGING information for the higher data sets by index level.</p>
	<b>AGE=</b>	<p>If SUMPFX=ALL is specified, AGE will change the starting age value.</p> <p>Default is 30 days.</p>
	<b>AGEINC=</b>	<p>If SUMPFX=ALL is specified, AGEINC will change the increment of aging.</p> <p>Default is 30 days.</p>
	<b>COMBINE</b>	<p>Specifies that the report will be produced in data set/volume serial number sequence, merging the various disk volumes into one (1) combined report.</p> <p>NOTE: The use of COMBINE REQUIRES that the execution Job Control include SORT-related DD statements (i.e.: SORTLIB, SORTWK01, ..., SORTWKnn, SYSOUT, etc.).</p> <p>The default is that each volume processed will have its own separate report.</p>
	<b>DETAIL=</b>	<p><b>NO</b> results in ONLY a track utilization and data set aging summary to be printed. The SUM=YES option must also be active otherwise no reports will be output. The reporting of DSCB's information related to each data set is bypassed.</p> <p>The default is DETAIL=YES.</p>
	<b>DSN=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only data sets having a name that matches the selection criteria (i.e.: compare length is 44) are selected from the VTOC for printing.</p> <p>The default is deferred to the DSG= operand.</p>
	<b>DSG=</b>	<p>Specifies string(s) from 1 to 44 characters in length. Only data sets having a name that matches the selection criteria (i.e.: compare length is the length of the data specified) are selected from the VTOC for printing.</p> <p>There is a special form of the DSG operand. Leading periods (.) after DSG= indicate that the group name starts after one or more index levels. Each period indicates that one (1) index level is to be bypassed.</p> <p>The default is that ALL data sets within each processed VTOC are printed.</p> <p>NOTE: DSN and DSG operands can be repeated and/or intermixed. A total of up to 200 strings can be specified.</p>
	<b>FORMAT=</b>	<p>Specifies that the report is to be prepared using other than the default selected by the program.</p> <p>PRT produces a 121 character line.</p> <p>CRT produces a 79 character line. (See report formats in <a href="#">Section 53.04</a> for further explanation).</p>
	<b>LINECNT=</b>	<p>Specifies the maximum number of lines each report page can contain. The number can be any value from 28 to 99 inclusive.</p> <p>The default is each page will contain a maximum of 58 lines.</p>

CONTINUED . . .

## 53.12 CONTINUED . . .

<b>ONLINE</b>	<p>The report facility normally will only process volumes specified by DISK(xxx) DD statements. This function causes a scan for any volume(s) that is(are) online to the system. These volumes will be appended to the normal DISK(xxxx) volume list, if any.</p> <p>NOTE: Non-MVS systems – ONLINE is NOT supported. Selection is based on DISK(xxxx) DD statements.</p>
<b>SELTERR=</b>	<p><b>YES</b> – Specifies that a condition code of 12 will be set if there are no data sets that match the selection criteria on this PRINT command.</p> <p><b>NO</b> – Specifies that a condition code of 12 will not be set if there are no data sets that match the selection criteria on this PRINT command.</p> <p>The default is YES.</p>
<b>SUM=</b>	<p><b>YES</b> results in the printing of the summary report after the detail listing.</p> <p><b>NO</b> results in the summary report being bypassed.</p> <p>The default is YES.</p>
<b>VOL=</b>	<p>Specifies string(s) from 1 to 6 characters in length. All volumes online to the system that match the selection criteria (i.e.: the compare length is six) will be selected for printing.</p> <p>The default is deferred to VOLG operand.</p>
<b>VOLG=</b>	<p>Specifies string(s) from 1 to 6 characters in length. All volumes online to the system that match the selection criteria (i.e.: the compare length is the length of data specified) will be selected for printing.</p> <p>The default, if neither VOL nor VOLG is specified, is that all volumes specified by DISKxxxx DD statements will be processed, plus all online volumes if ONLINE is specified.</p> <p>NOTE: VOL and VOLG operands may be repeated and/or intermixed. A total of up to 100 strings may be specified. On MVS systems, ABR will dynamically allocate this disk volume if a DISK(xxxx) DD card is not specified.</p>

CONTINUED . . .

## 53.12 CONTINUED . . .

## DISK SPACE SUMMARY ILLUSTRATION

FDR303 CARD IMAGE - \*PRINT VTOC,SUMPFX=YES,COMBINE GENERATE SUMMARY REPORT \*

FDR400 FDRABR DISK SPACE SUMMARY BY PREFIX - FDRABRV VER 4.8 - INNOVATION DATA PROCESSING DATE - 83.287 PAGE - 001

## DEVTYPE ACCUMULATORS

## DATA SET ORGANIZATION ACCUMULATORS

PREFIX	DEVTYPE	TOTAL DSNS	TOTAL XTNTS	ALLOC TRACKS	----SAM----	----PAM----	----UNUSED----	----DAM----	ISAM--VSAM	UNKNOWN-
					DSN TRKS	DSN TRKS	TRKS PER	DSN TRKS	DSN TRKS	DSNTRKS
****VTOC	3330	2	2	27						2 27
	3350	1	1	30						1 30
FDRABR	3330	1	1	20				1 20		
IDP	3330	32	35	6555		29 6080	2958 48%	1 475		2
	3350	14	12	2322	4 301	6 1840	673 31%	2 180	1	1
LMD	3330	2	2	95				1 95	1	
PPL1	3330	4	4	392		4 392	89 22%			
SYSCTLG	3330	1	1	10	1 10		9 90%			
	3350	1	1	10	1 10		9 90%			
SYS1	3330	5	5	1190		5 1190				
TISAMTWO	3350	1	1	1					1 1	
TVSAMONE	3350	1	1	30					1 30	
Z9999992	3330	3	5	1048					3 1048	

## DISK SPACE SUMMARY AND AGING REPORT

FDR303 CARD IMAGE - \*PRINT VTOC,SUMPFX=ALL,COMBINE GENERATE SUMMARY REPORT WITH AGING \*

FDR400 FDRABR DISK SPACE SUMMARY BY PREFIX - FDRABRV VER 4.8 - INNOVATION DATA PROCESSING DATE - 83.287  
PAGE - 001

## DEVTYPE ACCUMULATORS

## DATA SET ORGANIZATION ACCUMULATORS

PREFIX	DEVTYPE	TOTAL DSNS	TOTAL XTNTS	ALLOC TRACKS	----SAM----	----PAM----	----UNUSED----	----DAM----	ISAM--VSAM	UNKNOWN-
					DSN TRKS	DSN TRKS	TRKS PER	DSN TRKS	DSN TRKS	DSNTRKS
****VTOC	3330	2	2	27						2 27
	AGING 1 - 30	2	2	27						2 27
	3350	1	1	30						1 30
	AGING 1 - 30	1	1	30						
FDRABR	3330	1	1	20				1 20		
	AGING 1 - 30	1	1	20				1 20		
IDP	3330	32	35	6555		29 6080	2948 48%	1 475		2
	AGING 1 - 30	18	21	2564		18 2564	1320 51%			
	31 - 60	1	1	114		1 114	82 71%			
	61 - 90	4	4	212		4 212	98 46%			
	91 - ***	9	9	3665		6 3190	1448 45%	1 475		2
	3350	14	12	2322	4 301	6 1840	673 31%	2 180	1	1 1
	AGING 1 - 30	4	4	640	1 150	3 490	479 74%			
	31 - 60	2	2	450		2 450	32 7%			
	91 - ***	8	6	1232	3 151	1 900	162 15%	2 180	1	1
PPL1	3330	4	4	392		4 392	89 22%			
	AGING 1 - 30	3	3	382		3 382	80 20%			
	91 - ***	1	1	10		1 10	9 90%			
SYS1	3330	5	5	1190		5 1190				
	AGING 1 - 30	5	5	1190		5 1190				

THE ABOVE REPORT PROVIDES THE A B R USER DATA SET UTILIZATION BY ID.  
A B R WILL, ON REQUEST, REPORT BY USER ID ON THE NUMBER OF DATA  
SETS BY TYPE AND THE NUMBER OF TRACKS OWNED BY THESE DATA SETS.  
THE SECOND REPORT TYPE FURTHER BREAKS DOWN THE DATA SET

**53.13 PRINT UTILITY JCL EXAMPLES**

The following examples illustrate the most common ways of executing ABR REPORT functions. Note that, for convenience, all STEPLIB/JOBLIB DD statements have been omitted in the examples; they may be required, depending on your installation's placement of ABR.

**ISPF  
DIALOG  
SUPPORT**

Most of these reports are available under the ABR ISPF dialogs, on the FDRABR REPORT PANEL (ISPF option A.1). [Section 56.01](#) of this manual further explains this support.

**EXAMPLE  
1**

This example illustrates the JCL required to produce a report detailing all backup activity that has been recorded in the user's catalog. The report consists of information pertaining to the disk volume dumped, type and date of backup and information pertaining to the tape used for the dump function.

```
//PRI NT      EXEC   PGM=FDRABRP
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
PRI NT        CATLG
```

**EXAMPLE  
2**

This example illustrates the JCL required to produce a report detailing all data sets that have been scratched and recorded in the user's catalog. The report consists of information pertaining to the DASD volume and type of device that the data set existed on, and the backup tape file and volumes where the data was stored. The current backup information and old backups if any, will be displayed.

```
//PRI NT      EXEC   PGM=FDRABRP
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
PRI NT        SCRATCH, XREF, OLDBACKUP=ALL
```

**EXAMPLE  
3**

This example illustrates the JCL required to produce a report detailing the utilization of DASD space by USERID (highest level index). The number of data sets owned by each ID, the tracks occupied and the types of data sets by organization are detailed. Aging statistics by last reference date are also printed.

```
//PRI NT      EXEC   PGM=FDRABRP
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//ABRSUM      DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
PRI NT        VTOC, SUMPFX=ALL, ONLI NE, DETAI L=NO
```

CONTINUED . . .

## 53.13 CONTINUED . . .

**EXAMPLE 4** This example illustrates the JCL required to produce a report detailing information from the formatted VTOC at beginning of FDR, DSF and ABR backup tapes. The report is displayed in ascending data set name sequence for each 'TAPExxxx' DD statement.

```
//PRI NT      EXEC   PGM=FDRABRP
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//VSAMPRT     DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//TAPEOOO1    DD     DI SP=SHR, DSN=FDRABR. VMVSRS1. C1001000,
//              VOL=SER=100233, UNI T=TAPE, LABEL=4
//SYSI N      DD     *
PRI NT        TVTOC, LI ST=ABR                      ABR FORMAT VTOC REPORT
PRI NT        TVTOC, LI ST=DUMP                     IEHLI ST DUMP OF VTOC
```

**EXAMPLE 5** This example illustrates the JCL required to produce a report detailing all data sets that have been archived onto magnetic tape storage. The report consists of information pertaining to the disk volume from which the data sets were archived and the date they were archived. Also, certain data set attributes and information pertaining to the tape used for the dump function are displayed.

```
//PRI NT      EXEC   PGM=FDRABRP
//SYSPRI NT   DD     SYSOUT=*
//SYSOUT      DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//ARCHI VE    DD     DSN=FDRABR. ARCHI VE, DI SP=SHR
//SORTLI B    DD     DSN=SYS1. SORTLI B, DI SP=SHR
//SORTWK01    DD     SPACE=( TRK, 50, , CONTI G) , UNI T=DASD
//SORTWK02    DD     SPACE=( TRK, 50, , CONTI G) , UNI T=DASD
//SORTWK03    DD     SPACE=( TRK, 50, , CONTI G) , UNI T=DASD
//SYSI N      DD     *
PRI NT        ARCHI VE
```

**EXAMPLE 6** This example illustrates the JCL required to produce a report detailing information from the DSCBs on the volumes referenced by the VOL parameter. The report is displayed in ascending data set name sequence for each volume specified.

```
//PRI NT      EXEC   PGM=FDRABRP
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
PRI NT        VTOC, VOL=( PACK01, PACK02)
```

**EXAMPLE 7** This example illustrates the JCL required to produce a report detailing information from the DSCBs on the volume referenced by a 'DISK' DD statement, in addition to information related to the most current backup tape on which the data was stored. The report is displayed in ascending data set name sequence for each volume specified.

```
//PRI NT      EXEC   PGM=FDRABRP
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//DI SK1      DD     UNI T=DASD, VOL=SER=PACK01, DI SP=SHR
//DI SK2      DD     UNI T=DASD, VOL=SER=PACK02, DI SP=SHR
//SYSI N      DD     *
PRI NT        BACKUP
```

CONTINUED . . .

## 53.13 CONTINUED . . .

**EXAMPLE 8** This example illustrates the JCL required to produce a report detailing information from the DSCBs on all volumes referenced by the VOL parameter. The report is displayed in ascending data set name sequence for all volumes specified.

```
//PRI NT      EXEC   PGM=FDRABRP
//SYSPRI NT   DD     SYSOUT=*
//SYSOUT      DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SORTLI B    DD     DSN=SYS1. SORTLI B, DI SP=SHR
//SORTWK01    DD     SPACE=(TRK, 50, , CONTI G), UNI T=DASD
//SORTWK02    DD     SPACE=(TRK, 50, , CONTI G), UNI T=DASD
//SORTWK03    DD     SPACE=(TRK, 50, , CONTI G), UNI T=DASD
//SYSI N      DD     *
PRI NT        VTOC, COMBI NE, VOL=(PACK01, PACK02)
```

**EXAMPLE 9** This example illustrates the JCL required to produce a report detailing the status of all disk volumes online to the system. The report shows the status of all volumes related to ABR processing.

```
//PRI NT      EXEC   PGM=FDRABRP
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
PRI NT        VOLSTAT
```

**EXAMPLE 10** This example illustrates the JCL required to produce an Archive Report, a Catalog Report, and a Volume Status Report in a single job step.

The Archive Report will show the archived data sets in the reverse order of archival (the most recently archived data sets will appear first), and will only include information for data sets that were archived from volumes PACK01 and PACK02. The Catalog Report will only include information for backups of volumes PACK01 and PACK02.

```
//PRI NT      EXEC   PGM=FDRABRP
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//ARCHI VE    DD     DSN=FDRABR. ARCHI VE, DI SP=SHR
//SYSI N      DD     *
PRI NT        ARCHI VE, SORT=NO, VOL=(PACK01, PACK02)
PRI NT        CATLG, VOL=(PACK01, PACK02)
PRI NT        VOLSTAT, VOL=(PACK01, PACK02)
```

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**53.20 GENERALIZED REPORT WRITER (FDREPORT)**

FDREPORT is a generalized report writer which can generate reports on the DASD-related data that you specify, in a format that you specify. You can generate simple reports with very simple control statements, or complex reports using the great power of FDREPORT.

You can generate reports on a few data sets, large numbers of data sets, whole DASD volumes, or your entire installation. You can report on live data, or data ARCHIVED or backed up by ABR. You can select data through the system catalogs, or directly from disk volumes or other sources. You can generate a data file for further reporting or pass the data to other programs for further analysis. You can even punch JCL or control statements for other programs using the report data.

**FDREPORT is designed to report on large amounts of data from various sources without sacrificing performance. FDREPORT will require less elapsed time and system resources (CPU time and EXCPs) for a given function than any other competitive product.**

**Note: for YEAR2000 support, FDREPORT is capable of displaying all date fields with 4-digit year numbers. This is specified by the DATEFORMAT= operand.**

**INPUT  
SOURCES**

FDREPORT gathers input from a variety of sources:

- the VTOCs of online DASD volumes, for information on data sets or the entire volume
- for ICF VSAM and SMS data sets, the VVDS on those volumes, for VSAM and SMS information
- the ABR ARCHIVE Control File, for information on ARCHIVED data sets
- system catalogs. Catalogs are accessed for information on ICF VSAM clusters that exists only in the catalog. Catalogs can also be used as the primary input source, selecting cataloged data sets, then optionally accessing the DASD volumes or ARCHIVE control file for more information on the selected data sets
- the ABR catalog, for information on the ABR backups of DASD data sets
- backup data sets created by ABR, FDR, FDRDSF, or SAR, for information on DASD data sets in those backups



At any computer installation, users at a variety of levels need to be able to refer to accurate and timely information about the use of DASD resources. Accurate information is the only basis for sound decision making and future planning. Without adequate information it is impossible to determine how efficiently DASD space is being used, or predict how needs will grow. Accurate information is also essential for solving existing problems and for preventing problems from arising in the future.

FDREPORT provides easy-to-read management level reporting that allows you to easily see how effectively your DASD storage is being used, broken down by departments, projects, or individual users.

Since storage costs in most shops represent a significant part of the data processing budget, the ability to accurately monitor and adjust for current and future needs will result in significant cost savings and a more competitive cost for your end user.

Innovation strongly recommends that you run the Innovation Health Check jobstreams documented in [Section 53.21](#). These will help you understand the power, flexibility and efficiency of FDREPORT.

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## 53.20 CONTINUED . . .

**DATA SET REPORTS** Most reports are about individual data sets or ICF VSAM clusters. Although FDRPT has a default report format (giving some basic information about each data set) and some "canned" report formats (similar to those produced by FDRABRP in [Section 53](#)), you will probably want to customize your report.

FDRPT collects its data into hundreds of "fields", each containing some aspect of the data set, such as record format, size, CISE, creation date, and many, many others. [Section 53.36](#) contains a complete list of the fields available. You can select the data sets to be reported based on the values of most of these fields, and you can report on any set of them you select. You also control the positioning of the fields in the report.

**VOLUME REPORTS** FDRPT can also report on the status of entire DASD volumes, selecting and reporting on fields such as device type, available space, number of data sets (by type) and many others. [Section 53.36](#) also contains the list of fields available for volume reports. You have the same selection and reporting options for volume reports as you do for data set reports.

**SORTING** The report generated by FDRPT can be sorted using most of the report fields. For example, you may request that it report on all of the data sets currently online in size order. FDRPT will invoke the system SORT product when required, and can dynamically allocate required sort libraries and work areas.

**SUMMARIES** FDRPT can generate summaries on many of the report fields. These summaries can show you the various values that the summary fields had and counts of the occurrences of each value. The control break facility can cause summaries to be shown at various points in the report, when the value of some field changes.

**PUNCHING** FDRPT can generate control statements and JCL (or any arbitrary text) using a user-provided mask for the format of the data to be "punched", substituting the values of FDRPT report fields into that mask. For example, FDRPT can generate ABR control statements.

**DATA EXTRACT** FDRPT can write the selected data to an extract file (in a unique FDRPT format). The extract file can be used as input for further reports. This allows you to gather the data once and then report on it in various formats or using varying selection criteria.

It is possible to use this extract file as input to other data analysis programs, such as SAS, if they can read the extract file format. FDRPT can also "print" data in a simple tabular format (no headings or page breaks) for input into other programs.

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## 53.20 CONTINUED . . .

**FDREPORT  
STATEMENTS**

The FDREPORT statements specify the format of the report, the sort sequence, summary requirements and which data sets or volumes are to be selected. **Note that a PRINT statement is always the last statement in any group of statements, since it causes the report to actually be generated.** The statements are:

<b>DEFAULT</b>	Processing defaults.
<b>TITLE</b>	User defined title line.
<b>HEADING</b>	User-defined replacement column heading lines.
<b>SELECT</b>	Selection criteria for the data sets to be included in the report.
<b>EXCLUDE</b>	Criteria for excluding certain data sets from the report.
<b>XSELECT</b>	Selection criteria, using more flexible specifications than the SELECT statement.
<b>XEXCLUDE</b>	Criteria for exclusion, using more flexible specifications than the EXCLUDE statement.
<b>REPORT</b>	Selects data fields to be printed.
<b>SORT</b>	Requests sorting on selected data fields.
<b>SUMMARY</b>	Selects data fields to be summarized with optional control break criteria.
<b>BREAK</b>	Criteria for control breaks and summaries.
<b>PUNCH</b>	Controls generation of control statements and/or JCL from report data
<b>PRINT</b>	Generates the report requested by the preceding statements.
<b>CANCEL</b>	Cancels preceding statement specifications, when producing multiple reports in one execution.
<b>EXECUTE</b>	Causes FDREPORT statements to be read from a library.

The statements are documented in the order shown. PRINT is the statement which causes a report to actually be generated. The statements that precede PRINT plus operands on PRINT itself define the report to be generated. Placing statements in the wrong order, such as SELECTs after PRINT, will usually result in an incorrect report. You may have multiple PRINT statements in a given FDREPORT input to generate multiple reports; note that statements will remain in effect for subsequent PRINTs unless overridden or cancelled by a CANCEL statement.

**NOTE:** FDREPORT contains features which are not documented in this manual, due to space limitations. These include special-purpose customization options, special modes of execution, field names and detailed information or special instructions about various selection and reporting criteria. For complete information about these, execute the following jobstream:

```
//HELP          EXEC   PGM=FDREPORT
//SYSPRI NT     DD     SYSOUT=*
                HELP    ALL
```

This will print a lengthy document with additional information about FDREPORT. This report will fit on 8.5x11 inch paper if desired.

53.21 INNOVATION HEALTH CHECK

**INNOVATION  
HEALTH  
CHECK**

Innovation has developed a series of jobstreams, based largely on FDREPORT, which can be used to report on the general status of your DASD installation, plus it also reports on various "problem" conditions, such as uncataloged data sets, and volumes running out of free space or room in the VTOC. The jobstreams are also good examples of both simple and sophisticated use of FDREPORT. These jobstreams are found in the FDR ICL (Installation Control Library) in members:

**HCHECKI** – index to the other members, similar to the list printed below.

**HCHECK0** – FDREPORT Internal Parameter Check

**HCHECK1** – Dasd With Potential Problems:

Disk Volumes More Than 80% Full	Fragmentation Index, Worst First
VTOCs More Than 80% Full	VVDS More Than 80% Full
VVDS In Multiple Extents	VTOC Indexes More Than 80% Full
Volume Mount & Use Status, SMS,	List VVDSs and Check For Logical Errors
VTOCIX Status	
VTOC Logical Errors	

**HCHECK2** – Reports For SMS Administrator:

Volume SMS Status	SMS Volumes With Disabled VTOC
Dataset SMS Attributes	Indexes
Uncataloged Datasets On SMS Volumes	Information On PDSE Data sets
Datasets Ineligible For SMS Management	Non-Managed Datasets On SMS Volumes

**HCHECK3** – Reports For Performance Analyst:

Disks With Potential Performance Problems	Multi-Extent VSAM Data sets
Multi-Extent Non-VSAM Data sets	Datasets Likely To Get SX37 Abends
Multi-Volume Data sets	Poor VTOC/VVDS/VTOCIX Positions

**HCHECK4** – Reports For Capacity Analyst:

Disks With Potential Wasted Space	Installed Dasd Summarised By Device Type
Installed Dasd Summarised By Type and Model	Overallocation In All Data sets
Datasets Passed Their Expiration Dates	Datasets Not Referenced in 60 Days
Datasets Referenced In 60 Days, Overallocation	Datasets With Inefficient Blocksizes by size
Datasets With Inefficient Blocksizes by blocksize	Small Datasets With Inefficient Blocksizes
Total Space Available, Allocated, and Unused	Volumes with More Than 45% Freespace
VTOCs With More Than 45% Freespace	VVDSs With More Than 45% Freespace
VTOC Indexes With More Than 45% Freespace	

**HCHECK5** – Reports For VSAM Tuning Analyst:

Space Occupied By Largest VSAM Files	Busiest VSAM Files (EXCP Sort)
(Size Sort)	Clusters With High Inserts
Multi-Volume VSAM Files	Badly Split Clusters
Multi-Extent Clusters	Overallocated VSAM Clusters
Clusters With 3 Or More Index Levels	

**HCHECK6** – Reports Showing PDS Efficiency:

Basic Stats On PDS Data sets	Multi-Extent PDS Data sets
PDS With Limited Freespace	PDS With Limited Free Directory Blocks
PDS Datasets With Excess Free Space	Basic Stats On PDSE Data sets
Space Reclaimable By PDS Compression	

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**53.21 CONTINUED . . .****HCHECK7** – Report Datasets Which May Offend Standards:

Uncataloged Data sets	Wrongly Cataloged Data sets
Datasets With Undefined DSORG	Empty PS, PO, ICF-VSAM Data sets
Unmovable Data sets	Datasets Only In The Catalog

**HCHECK8** – Project or Dasd Management Reports:

Summary Of Dataset Types	Catalog Usage Report
Summary Of ISAM Files	Summary Of IAM Files
Space Occupied By An Application	Space Occupied By CNTL and JCL Files
Space Occupied By LIST and OUTLIST Files	Space Occupied By SYS1 & SYS2 Data sets
Space Summarized By Index	Space Summarized By 3rd Level
Dasd Utilization By Esoteric Unit Name SYSDA	Dasd Utilization By Esoteric Unit Name
Dasd Utilization By SMS Storage Group Name	Dasd Utilization By Volser Group
Dasd Utilization By Device Type	

**53.22 FDREPORT JCL REQUIREMENTS**

The following Job Control Statements are required to execute the FDR Generalized Report Facility.

**EXEC STATEMENT** Must specify the name of the ABR report writer program, FDREPORT. Since the storage requirements of FDREPORT vary depending on the functions requested, Innovation recommends that you specify REGION=0M so that the maximum region is available.

**JOBLIB or STEPLIB STATEMENT** If required, specifies the library in which FDREPORT resides (usually the FDR program library). This is usually an authorized library. If not authorized, most functions of FDREPORT will work but some may run more slowly.

**SYSPRINT DD STATEMENT** Specifies the primary output message data set. This is a required DD statement and is usually a SYSOUT data set.

**ABRMAP DD STATEMENT** Specifies the Report data set. When ABRMAP is not found within the JCL stream, the reports will be output to the SYSPRINT data set. The PAGEWIDTH operand will be ignored if ABRMAP is not present.

**ABRSUM DD STATEMENT** Specifies that the summary reports are to be printed on this data set. Usually a SYSOUT data set. If summaries are to be printed and ABRSUM is not found in the JCL, summaries will be printed on ABRMAP.

**SYSUDUMP DD STATEMENT** Recommended in all FDREPORT jobs in order to more easily diagnose error conditions which make FDREPORTabend. Usually a SYSOUT data set.

If you have the ABEND-AID product from COMPUWARE include the following so that a fully-formatted dump is produced:

```
//ABNLI GNR DD DUMMY
```

**SYSPUNCH DD STATEMENT** Specifies the output data set when RPTYPE=SELPCH is specified, for the storage of generated statements. FDREPORT will force DCB characteristics of RECFM=FB,LRECL=80; Any valid blocksize may be specified, but it will default to 80.

SYSPUNCH may be a DASD data set (sequential or a member of a PDS), but it may also be assigned to the JES internal reader "SYSOUT=(class,INTRDR)" to submit a complete jobstream for execution. You may also make SYSPUNCH a normal SYSOUT data set if you wish to view the generated statements.

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## 53.22 CONTINUED . . .

**SYSUT2 DD STATEMENT** Required when the RPTYPE=DATA (or COMPDATA) or DATATYPE=EXTRACT operands are specified, for the storage of FDREPORT internal data records. Normally a DASD data set but it may be on tape. If you want to use this extract file as input to another reporting program (such as SAS), the format of the records is defined by a macro @RPTDS which is a member in the FDR ICL (Installation Control Library).

When RPTYPE=DATA or RPTYPE=COMPDATA is specified it will be an output data set and FDREPORT will force DCB characteristics of RECFM=VB,LRECL=8200; any valid blocksize can be specified, or FDREPORT will assign a default value.

If you execute several PRINT statements in the same FDREPORT step, each with RPTYPE=DATA (or COMPDATA), and you want the extracted data from each to accumulate in the SYSUT2 data set, you must either specify DISP=MOD in the JCL or the ENABLE=MODOUTPUT operand. Otherwise, only data from the last PRINT will be available.

For DATATYPE=EXTRACT, SYSUT2 is used as input; it must be a data file created by the RPTYPE=DATA option of FDREPORT in an earlier step or job or earlier in this step. Although the format of the extract file has changed in various releases of FDR/ABR, FDREPORT can successfully process any extract file created by any prior release.

If required and not present in the JCL, FDREPORT will allocate an extract data set. If the EXTRACTDSN= operand is specified, the existing data set named will be allocated; you may optionally include the EXTRACTMEMBER= operand to select a member of a PDS for input or output. If EXTRACTDSN= is not included, a temporary data set will be allocated, which will be retained for the duration of the step so that it can be used as output and later as input when DATATYPE=EXTRACT is specified on another PRINT statement.

The SYSUT2 DD name may be changed by the DATADDNAME= operand.

**SYSUT1 DD STATEMENT** Required when the RPTYPE=DATA (or COMPDATA) and DATATYPE=EXTRACT operands are *both* specified on the same PRINT statement. Although SYSUT2 (described above) would normally be used for the data input, it cannot be used as both input and output in the same operation; in this case, SYSUT1 is used instead of SYSUT2 for the extracted data input, and SYSUT2 is used for output. The SYSUT1 DD name may be changed by the ALTDATADDNAME= operand.

**FDRLIB DD STATEMENT** Specifies a data set to be read for extra FDREPORT control statements. This data set is used if FDREPORT encounters an EXECUTE or PUNCH control statement. This data set can be a sequential data set or a partitioned data set but must have characteristics RECFM=FB and LRECL=80. The purpose of this data set is to store canned report formats and punch masks for execution by any user. The DD name may be changed by the FDRLIB= operand.

**DISKxxxx DD STATEMENTS** Optional and usually unnecessary. When the ENABLE=ONLINE operand is specified on PRINT, or VOL= or VOLG= operands are specified on statements preceding PRINT, the desired volumes will be dynamically allocated and DISKxxxx DD statements are not required.

If used, DISKxxxx DD statements specify the DASD volumes to be processed by statements that do not specify ONLINE, VOL= or VOLG=. The first four characters of the DDNAME must be 'DISK', and the remaining one to four characters may be any characters valid in a ddname (0-9, A-Z, \$, #, @). The DD statement should look like:

```
//DISKxxxx DD UNI T=uni tname, VOL=SER=vvvvvv, DISP=OLD
```

**TAPExxxx DD STATEMENTS** Required only if DATATYPE=TVTOC is specified. These DD statements must point to FDR-format backups on tape or disk; all backups created by FDR, FDRDSF, FDRABR and SAR can be used. All of the TAPExxxx DD statements in the step will be read when DATATYPE=TVTOC is used.

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## 53.22 CONTINUED . . .

**ARCHIVE DD STATEMENT** Specifies the name of an ABR ARCHIVE control file, if the DATATYPE=ARCHIVE option is used to process data from an archive control file. This is not required if the ARCHIVE control file whose name is in the ARCDN option of the FDR Global Option Table is to be read; FDREPORT will dynamically allocate it under DD ARCHIVE#. You may also specify the ARCDN= operand of FDREPORT to dynamically allocate any ARCHIVE control file.

**SORT DD STATEMENTS** (Optional) If you include the SORT or generate a report with data from multiple disk volumes, you may need to specify DD statements (e.g. SORTLIB, SORTWKnn) required by your system SORT product.

However, any or all of these SORT DD statements may be omitted if you have requested dynamic allocation of the SORT data sets via the SORTALLOC= operand of PRINT.

**SYSLIB DD STATEMENT** Required if the CHANGE=PERM or CHANGE=RESET options are specified on a DEFAULT statement, in order to permanently change FDREPORT default processing options. Must point to the load library containing FDREPORT and you must have UPDATE authority to that library.

**SYSIN DD STATEMENT** Specifies the control statement data set. Usually a DD \* or input data set.

**FDREPORT under TSO** FDREPORT may also be executed under TSO. Any required files must be preallocated (corresponding to the DD statements above). If the library containing ABR is in the linklist, then wherever you can enter a TSO command, you can simply type:

**FDREPORT**

if not, then you can type:

**CALL 'fdrlibrary(FDREPORT)'**

**In either case, FDREPORT will prompt for statement input.** Enter END to terminate FDREPORT. The SYSIN and SYSPRINT file names should be allocated to your terminal before invoking FDREPORT.

If you have the ABR ISPF panels installed, option A.1 (REPORTS) gives you the ability to generate pre-determined reports with FDREPORT (using the EXECUTE statement to select the report format from a library, with a SELECT statement generated from the panel.

**However, ISPF option A.S (the SRS dialog, described in [Section 56.40](#)) internally uses FDREPORT to generate much of its data, giving you the ability to interactively do the same sort of selection and reporting as done by FDREPORT.**



## 53.23 FDREPORT DEFAULT STATEMENT

DEFAULT	,ALTDATADDNAME=ddname	,LBPZERO= <u>INVALID</u>  VALID
	,ARCDN=dsname	,LINECNT=nn
	,BYTEFORMAT=BYTES  <u>KILOBYTES</u>   MEGABYTES	,MAXGDG=nnn
	,CHANGE=PERM RESET  <u>TEMP</u>	,MAXICF=nnnnn
	,COPY=BOTH  <u>EITHER</u>  1 2	,MAXONLINE=nnnn
	,DATADDNAME=ddname	,OLDBACKUP=(nn,nn,..) ALL  <u>CUR</u>
	,DATATYPE=ARCHIVE CATALOG CATARCH  CATVTOC EXTRACT TVTOC  VOLDATA VTOC	,PAGEWIDTH=nnn
	,DATEFORMAT=YYDDD MMDDYY DDMMYY  MMDDYY DDMMYYYY YYYYDDD	,RPTYPE=ABRVTOC ARCHIVE  COMPDATA DATA GENERATE HEX  NONE OSVTOC SELPCH TABLE XREF
	,DDCNT=nnn	,SKIP=n
	,DISABLE=(option1,option2,...)	,SORT=COMBINE  <u>NO</u>  YES
	,ENABLE=(option1,option2,...)	,SORTALLOC=(option1,option2,...)
	,DSKIP=n	,SORTCORE=nnnnnnn
		,SORTLIB=dsname
		,SORTMSGDDNAME=ddname
		,SORTPFX=cccc
	,EXTRACTDSN=dsname	,SUM=YES  <u>NO</u>  INDEX
	,EXTRACTMEMBER=membername	,SUMDEVICE= <u>BASE</u>  UNIQUE
	,FIELDPREFIX=c	,SYSUTSPACE=nnnn
	,FIELDSUFFIX=c	,SYSUTUNIT=unitname
	,FDRLIB=ddname	,TITLE=LEFT  <u>CENTER</u>  RIGHT
	,FORMAT=CRT PRT	,WORKDDNAMES=n
	,INDEXNUM=nn	,WORKSPACE=nnnn
		,WORKUNIT=unitname

**DEFAULT  
STATEMENT**

The DEFAULT statement changes FDREPORT's default values for various options used when generating a report. Most of the operands on the DEFAULT statement are also operands of the PRINT statement, and can be specified there. The DEFAULT statement can be used when more than one report (more than one PRINT statement) is to be generated in one FDREPORT run; the DEFAULT statement avoids having to specify options used in more than one report more than once. **Only the operands which are unique to the DEFAULT statement are described below; others are described in [Section 53.32](#) under the PRINT statement.**

The DEFAULT statement may also be used to permanently update default values of most of the operands of DEFAULT in the ABR program library so that all subsequent executions of FDREPORT will use the new values without having to specify them. The underlined defaults shown above (and in the PRINT statement) are the distributed defaults; your installation may have changed them. The defaults will be permanently changed when the CHANGE=PERM or CHANGE=RESET operand is specified; this requires that a SYSLIB DD statement be included in the FDREPORT JCL pointing to the ABR program library. The current defaults may be displayed by the ENABLE=DISPLAY operand; this display also shows which values are eligible for permanent change by CHANGE=PERM, which can only be changed in the FDR Global Option Table, and which cannot be changed.

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## 53.23 CONTINUED . . .

<b>OPERANDS</b>	<b>ARCDSN=</b>	<p>Specifies the data set name of the ARCHIVE Control File to be used as input if DATATYPE=ARCHIVE or DATATYPE=CATARCH is also specified and no ARCHIVE DD is present.</p> <p>The default is the ARCHIVE Control File name in the FDR Global Option Table and is usually FDRABR.ARCHIVE.</p>
	<b>CHANGE=</b>	<p>Allows the default values used by FDREPORT for other operands on the DEFAULT statement to be permanently changed. The available options are:</p> <p><b>PERM</b> – permanently change the default values for many other operands specified on the DEFAULT statement, as described above.</p> <p><b>RESET</b> – reset all defaults back to the original values distributed with FDREPORT.</p> <p><b>TEMP</b> – operands on the DEFAULT statement affect this execution of FDREPORT only.</p> <p>PERM or RESET requires that a SYSLIB DD statement pointing to the ABR program library be included in the FDREPORT JCL; you must have UPDATE authority to this library.</p> <p>The default is TEMP.</p>
	<b>DDCNT=</b>	<p>Specifies the maximum number of user-specified DISKxxxx DD names that can be processed in any execution of FDREPORT, from 5 to 400. Note that Innovation recommends dynamic allocation of volumes to be processed, by use of the VOL= and ENABLE=ONLINE options.</p> <p>The default is 100.</p>
	<b>FIELDPREFIX=</b>	<p>Specifies the character that marks the beginning of a field name in a punch mask or TITLE statement. Valid characters are &lt; &amp;\$*%_&gt;:#@ but the default of &lt; should not be overridden unless you need to use that character as data in the mask.</p>
	<b>FIELDSUFFIX=</b>	<p>Specifies the character that marks the end of a field name in a punch mask or TITLE statement. Valid characters are &lt; &amp;\$*%_&gt;:#@ plus a blank but the default of &gt; should not be overridden unless you need to use that character as data in the mask.</p>
	<b>FDRLIB=</b>	<p>Specifies the DD name to be used for reading FDREPORT control statements by the EXECUTE statement or punch mask definitions by the PUNCH statement. Can also be specified on those statements.</p> <p>The default is FDRLIB.</p>
	<b>MAXICF=</b>	<p>Specifies the maximum number of ICF VSAM clusters whose description can be retained in storage for any one report, from 100 to 10000. It is used only with DATATYPE=ARCHIVE or CATARCH.</p> <p>The default is 400 clusters.</p>

## 53.24 FDREPORT TITLE STATEMENT

**TITLE**                    **LINE='text'**  
                               **,SKIP=n**

**TITLE STATEMENT**    The TITLE statement defines a user-specified TITLE LINE to be displayed on every page of the report between the INNOVATION header identification and the data header lines. Under TSO, the INNOVATION header is not displayed. A maximum of one line may be specified.

**OPERANDS**    **LINE=**                    Specifies the text to be printed or displayed. Must be enclosed in quotes. The number of characters specified must not exceed the page width. If the TITLE cannot be contained on one control statement (Column 1 to 71), the user can continue the text by specifying a '+' or '—' after the last character on this line.

If '+' is specified, FDREPORT will scan for the first non-blank character on the next input line, so you can start the continuation in any column. If '—' is specified FDREPORT will start with column 1 of the next input line.

EXAMPLE:            TI TLE LI NE=' BACKUP +  
    REPORT'

The title text may contain FDREPORT fields, so that the title on each may contain data that related to the values displayed on that page. Any FDREPORT field name that is valid for SORT (see the tables in [Section 53.36](#)) may be included. You surround the field names with the FIELDPREFIX and FIELDSUFFIX characters that are in effect at the time that the TITLE statement is read (set by a previous DEFAULT or PUNCH statement; they default to < and >). FDREPORT will substitute the value for that field that is current at the time each new page is printed.

EXAMPLE:            TI TLE LI NE=' REPORT FOR VOLUME <VOL>'

**SKIP=**                    Specifies the number of lines to be left blank between the TITLE LINE and the data heading line, from 1 to 3.

Default is 1.

**53.25 FDREPORT HEADING STATEMENT**

**HEADING**            **LINE(1)**='first heading line text'  
  
                         **,LINE(2)**='second heading line text'  
  
                         **,LINE(3)**='third heading line text'

**HEADING STATEMENT** By default, FDREPORT provides column headings with text which is descriptive of the field(s) in each column (e.g., DSNAME, SIZE). The HEADING statement allows you to specify replacement text of your choosing. It is your responsibility to line up the heading text with the actual columns generated by FDREPORT; this may take some experimentation.

**OPERANDS**    **LINE(n)=**            Specifies the replacement heading text for heading line n (n=1, 2, or 3).  
  
                         If the heading text cannot be contained in one control statement (columns 1 to 71), it may be continued using the same conventions described for the TITLE statement ([Section 53.24](#)).

## 53.26 FDREPORT (X)SELECT/(X)EXCLUDE STATEMENT

**SELECT**            **DSN**=(dsname,...,dsname)  
**EXCLUDE**        **DSG**=(dsgroup,...,dsgroup)

,**VOL**=(vvvvvv,...,vvvvvv)

other FIELD names from the tables in [Section 53.36](#)

**XSELECT**        **DSN** op (dsname,...,dsname)  
**XEXCLUDE**      **DSG** op (dsgroup,...,dsgroup)  
                  **XDSN** op (dsnamemask,...,dsnamemask)  
                  **MEMNAMES** op (member,...,member)

,**VOL** op (vvvvvv,...,vvvvvv)

,**STORGRP** op (ssssssss,...,ssssssss)

,**UNIT** op (uuuuuu,...,uuuuuu)

,**UNITNAME** op (uuuuuuuu,...,uuuuuuuu)

other FIELD names from the tables in [Section 53.36](#)

**SELECT/  
XSELECT/  
EXCLUDE/  
XEXCLUDE  
STATEMENTS**

These statements act as a filter for the data sets to be processed by FDREPORT. The SELECT and EXCLUDE statements use fairly simple comparisons ("equal to" for some tests, "equal or greater than" for others), while the XSELECT and XEXCLUDE statements may use more sophisticated comparisons (less than or equal, greater than, not equal, etc.), as well as a data set name masking capability.

On the SELECT and EXCLUDE statements, operands may be followed ONLY by an equal sign (=). The value you provide after the equal will be compared to the value of the field associated with a given data set. The comparison will be true for certain fields if the value is exactly equal; for other fields it is true if the field is equal or greater than your value (see below).

On the XSELECT and XEXCLUDE statements, the operands may be followed by one of a number of comparison operators. Since one form of those operators involve special characters (such as the not(¬) and less-than(<)), alternate forms of each operator without special characters are provided. The operators are:

=	or	.EQ.	equal
¬=	or	.NE.	not equal
<	or	.LT.	less than
>	or	.GT.	greater than
<=	or	.LE.	less than or equal to
>=	or	.GE.	greater than or equal to

The test will be true if the indicated comparison of the FIELD value and the value you provide is true.

For example, SIZE>15,DSORG.NE.PS

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## 53.26 CONTINUED . . .

On the XSELECT and XEXCLUDE statements, if the operation is equal (=, .EQ.) or not-equal (≠, .NE.), several values may be provided in parentheses. For equal, the test is true if any of the comparisons are equal. For not-equal, the test is true if all of the comparisons are not-equal. For example,

LRECL=(80, 133)

will select datasets whose LRECL is either 80 or 133. Also, a given FIELD name may be specified more than once with several different operators; all of the tests must be true for the dataset to be selected (unless all of the operators are equal (=, .EQ.) when it is sufficient for any one of the tests on that field to be true). For example:

SI ZE>50, SI ZE<100, DSORG=PS, DSORG=PO

will select any PS or PO datasets between 50 and 100 tracks in size.

When processing data sets from source selected by DATATYPE= on the PRINT statement, each data set will be passed through this filtering process:

- If any EXCLUDE or XEXCLUDE statements are present, the data set's FIELD values will be compared to each statement. If ALL of the tests on a given statement are true, then the data set will be excluded from processing.
- If any SELECT or XSELECT statements are present then for any data set which was not excluded, the data set's FIELD values will be compared to each of them. If ALL of the tests on a given statement are true, the data set will be processed.
- If there are no SELECT or XSELECT statements present then all data sets which are not excluded will be processed. If none of the above statements are present, then all data sets found on FDREPORT's input will be processed.

The order of the (X)SELECT and (X)EXCLUDE statements is not significant. However, **each statement operates independently**. For example, if you want to select all PDSs on volumes starting with ABC, code:

SELECT DSORG=PO,VOL=ABC\* <--- CORRECT

If you code:

SELECT DSORG=PO <--- INCORRECT

SELECT VOL=ABC\*

it will select all of the data sets on those volumes, not just the PDSs.

#### FIELD NAME OPERANDS

In addition to the operands described in this section, you can also include any of the FIELDS described by the tables in [Section 53.36](#) if they are marked as valid for SELECT or XSELECT.

- If an "E" is shown in the SELECT column, then that FIELD may be used on SELECT or EXCLUDE statements and the comparison will be true if the value of the FIELD exactly equals the value you provide.
- If a "G" is shown in the SELECT column, then that FIELD may be used on SELECT or EXCLUDE statements but the comparison will be true if the value of the FIELD is equal to or greater than the value you provide.
- If a "E" is shown in the XSELECT column, then that FIELD may be used on XSELECT or XEXCLUDE statements followed ONLY by an equal or not-equal operation.
- If an "A" is shown in the XSELECT column, then that FIELD may be used on XSELECT or XEXCLUDE statements followed by any of the comparison operators supported.

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## 53.26 CONTINUED . . .

For most of the FIELD operands, the values that you specify are obvious. For example, LRECL= takes numeric values specifying logical record lengths. For some FIELDS the rules are not so obvious:

- For FIELDS that represent dates, such as ADATE, EXPDATE and LRDATE, the value must be specified as a Julian date, i.e., year plus day number.
  - For years in the 19xx range you can specify a 2-digit year, e.g., ADATE=95123
  - For any year you can specify a 4-digit year, e.g., EXPDATE=2003123 (required for years beyond 1999)
  - To improve readability, you can insert a period between the year and day, e.g., BKDATE=95.321

The date fields will not accept Gregorian dates (month, day, and year), but you can request **display** of dates in Gregorian format with the DATEFORMAT= operand on the PRINT or DEFAULT statement.

- For FIELDS that represent a number of bytes, such as BYTES and PRIBYTES, you may specify values in bytes (a simple number, such as BYTESFRE=5000), kilobytes (a number followed by K, such as BYTES=250K), or megabytes (a number followed by M, such as BYTESUSE=450M). See option HEXBYTES in [Section 53.35](#) for the interpretation of kilobytes and megabytes.
- For FIELDS that represent flags or similar attributes, such as ARCFLAG1, ATTR1, DSIND, and SMSFLAGS, the values that you use on (X)SELECT/(X)EXCLUDE statement may be different from the values that are displayed in a report. The field values are often abbreviated by 1 or 2 characters in a report to save space, but on these statements you may need to put the longer description. For example, ARCFLAG2 will display a value of A if the data set is cataloged for auto-recall, but you would say XSELECT ARCFLAG2=(RECALL) to select on that flag. The tables in [Section 53.36](#) show the report values and the selection values for such fields.

OPERANDS	DSN	Specifies one or more data set names, up to 44 characters each. These names will be compared to those of data sets and VSAM clusters. For the SELECT/EXCLUDE statement only DSN= is supported.
	DSG	Specifies one or more data set name prefixes, up to 44 characters each. The data set names and VSAM cluster names will be checked to see if they begin with the prefix. For the SELECT/EXCLUDE statements, only DSG= is supported. The XDSN=operand, described below, provides a much more flexible way of selecting data set names with a mask.  There is a special form of the DSG operand. Leading periods(.) after DSG= or DSG-= indicate that the compare for the prefix name starts after one or more index levels. Each period indicates that one (1) index level is to be bypassed.  <b>NOTE:</b> DSN, DSG and XDSN operands can be repeated and/or intermixed.
	MEMNAMES	(XSELECT/XEXCLUDE statements only) For PDSs, matches the data set only if it contains (MEMNAMES=) or does not contain (MEMNAMES=) the members specified.
	STORGRP	(XSELECT/XEXCLUDE statements only) Selects (STORGRP=) or excludes (STORGRP-=) all online volumes defined as belonging to the specified SMS storage group. A storage group prefix can be specified by following the prefix with an asterisk, e.g., STORGRP=DB*. Multiple storage groups and/or prefixes may be specified by enclosing them in parentheses, separated by commas. Valid only on systems with SMS active.

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## 53.26 CONTINUED . . .

<b>UNIT</b>	(XSELECT/XEXCLUDE statements only) Selects online volumes based on their device address, up to 4 hexadecimal digits.  All comparison operands are valid (e.g., UNIT>=140).
<b>UNITNAME</b>	(XSELECT/XEXCLUDE statements only) Selects (UNITNAME=) or excludes (UNITNAME¬=) all online volumes which are mounted on a DASD unit which is included in the specified generic (e.g., UNITNAME=3380) or esoteric name (e.g., UNITNAME=SYSDA). This is limited to names which are valid for UNIT= in JCL at your installation. Multiple units may be specified by enclosing them in parentheses, separated by commas.
<b>XDSN</b>	<p>(XSELECT/XEXCLUDE statements only) selects or excludes data sets based on a mask tested against the data set name or VSAM cluster name. XDSN= and XDSN¬= are supported. This mask may contain:</p> <ul style="list-style-type: none"> <li>• any valid (alphanumeric or national) character representing itself.</li> <li>• / (slash) represents a single valid character</li> <li>• – (minus or hyphen) represents a single valid alphabetic character</li> <li>• + (plus) represents a single valid numeric character</li> <li>• ? (question) represents a single valid national character (#, \$, or @).</li> <li>• * (single asterisk) represents zero or more valid characters within one index level</li> <li>• * * (double asterisk) represents zero or more valid characters contained in one or more index levels (including their periods).</li> <li>• . (period) represents a period (index level) in the data set name except for the special cases below.</li> <li>• * *. (double asterisk, period) at the beginning of the string represents one or more index levels at the beginning of the dsname.</li> <li>• . * * (period, double asterisk) at the end of the string represents one or more index levels at the end of the dsname.</li> <li>• . * *. (period, double asterisk, period) in the middle of the string represents either a SINGLE period or one or more index levels at that point.</li> </ul> <p>Examples:</p> <p>XDSN=A. * * selects any data set with a first index level of exactly "A".</p> <p>XDSN=A * * selects any data set with a first index level that begins with "A".</p> <p>XDSN=A * . * * is equivalent to XDSN=A * *</p> <p>XDSN=A * . * . * * selects any data set with a first index level beginning with "A" which has at least 3 index levels.</p> <p>XDSN=A * . * . * selects any data set with a first index level beginning with "A" which has exactly 3 index levels.</p> <p>XDSN= * * . * .CNTL selects any data set of at least two index levels ending in ".CNTL".</p> <p>XDSN=///. * * selects any data set starting with a first index level exactly 3 characters long.</p>

**NOTE:** DSN, DSG and XDSN operands can be repeated and/or intermixed.

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## 53.26 CONTINUED . . .

**VOL**

Specifies 1 or more DASD volume serial numbers. A volume serial prefix can be specified by following the prefix with an asterisk, e.g., VOL=TSO\*. For the SELECT/EXCLUDE statement only VOL= is supported; XSELECT/XEXCLUDE support both VOL= and VOL=\*. Multiple volume serials and/or prefixes may be specified by enclosing them in parentheses, separated by commas.

The VOL= operand may be repeated on a single statement; all of the specified volumes will be selected (or excluded). On XSELECT/XEXCLUDE statements, VOL=, UNIT=, UNITNAME= and STORGRP= may be specified separately, repeated, and/or intermixed on one statement to specify the volumes to be processed. If none of these operands are specified, then the volumes on which the data sets reside will not be a criteria for selection.

**NOTE:** FDREPORT will dynamically allocate any online disk volume identified by VOL, UNIT, UNITNAME and/or STORGRP if a DISKxxxx DD statement is not specified for that volume. The ENABLE=ONLINE operand of the PRINT statement is not required.

### 53.27 FDREPORT REPORT STATEMENT

**REPORT**                      **FIELD=(field1,field2,...,fieldn)**

**,RESET|NORESET**

<b>REPORT STATEMENT</b>	<p>The REPORT statement specifies the FIELDS which will be included in the output generated by the PRINT statement. The FIELDS will be placed on the report in the order specified. The appropriate heading will be automatically generated for each FIELD selected unless the HEADING statement is present. One blank will be inserted between adjacent fields unless overridden by SPn. If the FIELDS selected generate a line greater than the page width, FDREPORT will truncate the line and issue a warning message. If ENABLE=AUTOSTACK is specified on the PRINT or DEFAULT statement, FDREPORT will stack as many related FIELDS with matching print length and data type as needed to fit the report within the page width. If stacking does not generate a line within the page width, FDREPORT will truncate the line and issue a warning message.</p>
-------------------------	--

<b>DEFAULT REPORT</b>	If the REPORT statement is not specified, FDREPORT will generate a report with the following FIELDs: SPLDSN, VOL, DSORG, RECFM, BLKSIZE, LRECL, SIZE, SIZEFREE, %FREE.
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If DATATYPE=VOLDATA, the default report will be: VOL, DEVTYPE, UNIT, VLINDSTA, VLUSEATR, VLTRKVOL, VLALOTRK, VL%UTRKS, VLFREETRK, VLLRGCYL, VLVTOTCR, VLDSCB1 and VL%UDSCB.

<b>OPERAND</b>	<b>FIELD=</b>	Specifies one or more names of the FIELDS to be printed. Hundreds of field names are available, in 8 groups: VTOC, VSAM, SMS, PDS, IAM, ABR BACKUP, GENERATED and VOLUME. Fields from any group may be specified. Any which do not apply to a given report line will be blank or zero.
		All of the FIELD names are documented in the tables in <a href="#">Section 53.36</a> are valid
		If SPn is specified as one of the FIELD operands, FDREPORT will insert the number of spaces specified by n (from 0 to 9) between the previous FIELD specified and the next FIELD.
		The following example specifies that three (3) blanks be inserted between the FIELD VOL and DATES.

EXAMPLE: REPORT FIELD=(DSN,VOL,SP3,DATES)

The default is one (1) blank between fields.

<b>RESET</b>	<b>RESET</b> (the default) indicates that the list of fields on this REPORT statement completely replaces the values on any preceding REPORT statement.
<b>NORESET</b>	<b>NORESET</b> indicates that these fields should be added to the list of fields currently in effect from preceding REPORT statements.

## 53.28 FDREPORT SORT STATEMENT

**SORT**                      **FIELD**=(field1,field2,...)

**,SEQUENCE**=(A|D,...)

**,BREAK**=(NO|EJ|RPM|SEJ|SP|SSP|SUB|YES,...)

**,RESET**|**NORESET**

**SORT  
STATEMENT**

The SORT statement specifies the fields to be used to SORT the data selected. You can specify one or more fields to be used for the SORT. Most of the fields which can be reported on can be selected whether or not that field is to be printed.

If this statement is not specified, the SORT=COMBINE and SORT=YES options on PRINT and DEFAULT, and several other reporting options which require sorting, will invoke sorting with default sorting parameters.

Sorting may require that you specify certain DD statements for your SORT product (see JCL REQUIREMENTS in [Section 53.21](#)) or FDREPORT may dynamically allocate all required SORT files (see SORTALLOC= in [Section 53.32](#)).

The BREAK statement, described in the next section, provides a simpler alternative to the SORT statement when all fields are to be sorted in ascending order and a standard control break is to be taken on every field.

**OPERANDS****FIELD=**

Specifies one or more FIELDS to be used by FDREPORT for the SORT. If more than one FIELD is specified, they are sorted in the order specified.

The tables in [Section 53.36](#) document the available FIELD names; check the SORT column to see which are supported for sorting.

**SEQUENCE=**

Specifies the SEQUENCE in which the corresponding SORT FIELD is to be SORTed.

**A** – ascending sequence.

**D** – descending sequence.

If more than one FIELD was specified, each value coded is associated with the relative position of the FIELD specified.

For example, if FIELD=(A,B,C) is specified with SEQUENCE=(D,A,D), FIELD A will be SORTed descending, FIELD B ascending and FIELD C descending.

The default is A (ascending).

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## 53.28 CONTINUED . . .

**BREAK=** Specifies if a change in the value of a SORT FIELD is to cause a control break, and what action to take at that break.

**NO** – no control break.  
**EJ** – page eject only.  
**RPM** – reset punch mask (reinitialize punch mask processing, [See Section 53.31](#)).  
**SEJ** – subtotal summary fields and page eject.  
**SP** – space one line only.  
**SSP** – subtotal summary fields and space one line.  
**SUB** – subtotal summary fields.  
**YES** – subtotal summary fields, space one line, and reset punch mask.

If more than one FIELD was specified, each value coded is associated with the relative position of the FIELD specified.

For example, if FIELD=(A,B,C) is specified with BREAK=(YES,NO,SSP), a change in FIELD A will do summary processing, FIELD B will not, and FIELD C will cause subtotals with a blank line.

The default is NO for all FIELDS.

**RESET**  
**NORESET**

**RESET** (the default) indicates that the list of fields on this SORT statement completely replaces the values on any preceding SORT or BREAK statement.  
**NORESET** indicates that these fields should be added to the list of fields currently in effect from preceding SORT or BREAK statements.

## 53.29 FDREPORT BREAK STATEMENT

**BREAK** **FIELD=**(field1,field2,...)  
**,RESET|NORESET**

**BREAK STATEMENT** The BREAK statement provides a simple alternative to the SORT statement when you want to sort every field in ascending order and take a standard control break when any value changes. In other words,

BREAK FIELD=(A,B,C)

is equivalent to

SORT FIELD=(A,B,C),BREAK=(YES,YES,YES)

Details are found in [Section 53.28](#) (SORT statement)

**OPERANDS** **FIELD=** Specifies one or more FIELDS to be used by FDFEPORT for the SORT. If more than one FIELD is specified, they are sorted in the order specified. All fields are sorted in ascending order.

The tables in [Section 53.36](#) document the available FIELD names; check the SORT column to see which are supported for sorting.

**RESET** **NORESET** **RESET** (the default) indicates that the list of fields on this BREAK statement completely replaces the values on any preceding BREAK or SORT statement. **NORESET** indicates that these fields should be added to the list of fields currently in effect from preceding BREAK or SORT statements.

**SUMMARY** **FIELD**=(field1,field2,...)  
**,RESET|NORESET**

The SUMMARY statement provides summary reports based on the values of various fields reported by FDREPORT. Summary reports will be printed on the ABRSUM DD if present, or will be interspersed with the generated report on ABRMAP or SYSPRINT if ABRSUM is absent.

Summaries will be printed at control breaks (see the BREAK= operand of the SORT statement) and at the end of the report. The final summary will contain totals for the entire report; control break summaries will contain values since the last control break.

FIELD=

The tables in [Section 53.36](#) document the available FIELD names; check the SUMMARY column to see which are supported for summarization and the type of summary which will be done.

**RESET** (the default) indicates that the list of fields on this SUMMARY statement completely replaces the values on any preceding SUMMARY statement. **NORESET** indicates that these fields should be added to the list of fields currently in effect from preceding SUMMARY statements.

## 53.31 FDREPORT PUNCH STATEMENT

<b>PUNCH</b>	<b>ECHO</b>  <b>,FDRLIB=</b> ddname  <b>,FIELDPREFIX=</b> c <b>,FIELDSUFFIX=</b> c  <b>,MASKNAME=</b> member  <b>,MAXSTATEMENTS=</b> nnnn  <b>,SYMBOLS=</b> (symbol,symbol,...) <b>,VALUES=</b> (value,value,...)
--------------	---

**PUNCH STATEMENT** The PUNCH statement specifies the location of a mask used to define the "punch" output generated by FDREPORT for the RPTYPE=SELPCH report and is ignored if RPTYPE=SELPCH is not specified.

The punch mask input must be a data set that has the attributes: RECFM=FB,LRECL=80. It may be either sequential (DSORG=PS) or partitioned (DSORG=PO). The PUNCH statement uses the presence or absence of the MASKNAME= operand to differentiate between sequential or partitioned data sets. If MASKNAME= is specified, the data set is assumed to be partitioned and MASKNAME= provides the member name. If MASKNAME= is omitted, the data set is assumed to be sequential (the FDRLIB= operand must be provided to specify the input DD name). If neither FDRLIB nor MASKNAME is specified, the PUNCH statement is ignored. The punch mask may also be an input stream (DD \*) data set.

For each record processed by FDREPORT, it will scan the punch mask, copying each mask record to the punch output DD statement (SYSPUNCH), but if any FDREPORT field names or special names are found in the mask, the current value of the name is substituted. These field names and special names must be surrounded by the delimiters specified by the FIELDPREFIX= and FIELDSUFFIX= operands; the defaults for these are < and >, so the field names are usually specified like: <LRECL>. The field names that may appear in the PUNCH mask are found in the tables in [Section 53.36](#) (check the PUNCH column). In addition to the those field names, the following special names may be used:

- \$\$CNTFDR – record counter with one (1) byte significance ranging from 0-9, A-Z.
- \$\$CNT2 – record counter with two (2) byte significance.
- \$\$CNT3 – record counter with three (3) byte significance.
- \$\$CNT4 – record counter with four (4) byte significance.
- \$\$CNT5 – record counter with five (5) byte significance.
- \$\$CNT6 – record counter with six (6) byte significance.
- \$\$LPCNT2 – loop counter with two (2) byte significance.
- \$\$LPCNT3 – loop counter with three (3) byte significance.
- \$\$PRCNT2 – prior record counter with two (2) byte significance.
- \$\$PRCNT3 – prior record counter with three (3) byte significance.
- \$\$+CNT2 – prior loop counter with two (2) byte significance.
- \$\$+CNT3 – prior loop counter with three (3) byte significance.
- TODAY – current date in Julian format, i.e., yyddd.
- user-specified variable names (the SYMBOLS= operand)

The counters can be used to generate names (such as step names, DD names) which are unique. The \$\$CNTxxx counters are incremented for each FDREPORT record (data set name) passed through the punch mask. The \$\$LPCNTx counters increment each time the punch mask is initialized (such as a control break). The \$\$Pxxxx counters contain the prior value of the associated counter (for example, for generating refer-back JCL).

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## 53.31 CONTINUED . . .

There are five (5) positional operands that can be used within the mask to permit one time generation of a segment of the mask. The operands must begin in column one (1) and are described as follows:

- )REPRO – statements following are processed only once.
- )PREFIX – statements following are processed once per loop, at the beginning of the loop, controlled by BREAK=RPM/YES on SORT statement).
- )ENDPREFIX – terminates the loop prefix statements.
- )SUFFIX – statements following are processed once per loop, at the end of the loop.
- )INCREMENTLOOP – increment current loop count. Only executed once.

An example of a punch mask:

```
) PREFI X
//USER1LST   JOB   (USER1, 123) , LI STCAT, MSGCLASS=X,
//                               CLASS=C
) ENDPREFI X
//STEP<$$CNT3> EXEC PGM=I DCAMS
//SYSPRI NT   DD    SYSOUT=*
//SYSI N      DD    *
LI STCAT ENT(<NAME>) ALL
) SUFFI X
//STEPEND     EXEC PGM=SOMEPGM
//SYSPRI NT   DD    SYSOUT=*
```

If RPTYPE=SELPCH is specified and no PUNCH statement is present, the default punch mask is:

```
SELECT VOL=<VOL>, DSN=<NAME>
```

which generates statements acceptable to ABR.

<b>OPERANDS</b>	<b>ECHO</b>	Specifies that the punch mask is to be printed on SYSPRINT. The default is the mask will not be printed.
	<b>FDRLIB=</b>	Specifies the ddname to be used when reading punch masks. Either FDRLIB= or MASKNAME= must be specified. The default is FDRLIB.
	<b>FIELDPREFIX=</b>	Specifies the character that marks the beginning of a field name in a punch mask. Valid characters are < &\$*%_>:#@ but the default of < should not be overridden unless you need to use that character as data in the mask.
	<b>FIELDSUFFIX=</b>	Specifies the character that marks the end of a field name in a punch mask. Valid characters are < &\$*%_>:#@ plus a blank but the default of > should not be overridden unless you need to use that character as data in the mask.
	<b>MASKNAME=</b>	Specifies the member of the data set pointed to by the ddname specified in the operand FDRLIB is to be used as a mask for the RPTYPE=SELPCH output. The FDRLIB data set must be partitioned (PO). Either FDRLIB= or MASKNAME= must be specified.
	<b>MAXSTATEMENTS=</b>	Specifies the number of control statements that can be present in any single punch mask. The number may be a value from 10 to 4000, inclusive. The default is 400 statements.

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## 53.31 CONTINUED . . .

- SYMBOLS=** Specifies 1 or more user-defined field names which can be specified in the punch mask. The corresponding value of each field name must be specified by a VALUES= operand. This can be used to insert variable information (e.g., security or accounting parameters) in a punch mask.
- VALUES=** Used with the SYMBOLS= operand to specify the values of the user-defined fields to be substituted in the punch mask. There must be as many values specified as there are field names in the SYMBOLS= operand.

## 53.32 FDREPORT PRINT STATEMENT

PRINT	ALTDATADDNAME=ddname ,ARCLIMIT=nnnn ,BYTEFORMAT=BYTES  <u>KILOBYTES</u>   MEGABYTES ,COPY=BOTH  <u>EITHER</u>  1 2 ,DATADDNAME=ddname ,DATATYPE=ARCHIVE CATALOG  CATARCH CATVTOC EXTRACT TVTOC  VOLDATA  <u>VTOC</u> ,DATEFORMAT= <u>YYDDD</u>  MMDDYY  DDMMYY MMDDYY DDMMYYYY  YYYYDDD ,DISABLE=(option1,option2,...) ,ENABLE=(option1,option2,...) ,DSKIP=n ,EXTRACTDSN=dsname ,EXTRACTMEMBER=membername ,FORMAT=CRT PRT ,INDEXNUM=nn ,LBPZERO= <u>INVALID</u>  VALID ,LINECNT=nn	,MAXGDG=nnn ,MAXONLINE=nnnn ,OLDBACKUP=(nn,nn,...) ALL  <u>CUR</u> ,PAGEWIDTH=nnn ,RPTYPE=ABRVTOC ARCHIVE COMPDATA  DATA  <u>GENERATE</u>  HEX NONE OSVTOC  SELPCH TABLE XREF ,SKIP=n ,SORT=COMBINE  <u>NO</u>  YES ,SORTALLOC=(option1,option2,...) ,SORTCORE=nnnnnnn ,SORTLIB=dsname ,SORTMSGDDNAME=ddname ,SORTPFX=cccc ,SUM=YES  <u>NO</u>  INDEX ,SUMDEVICE= <u>BASE</u>  UNIQUE ,SYSUTSPACE=nnnn ,SYSUTUNIT=unitname ,TITLE=LEFT  <u>CENTER</u>  RIGHT ,WORKDDNAMES=n ,WORKSPACE=nnnn ,WORKUNIT=unitname
-------	---	---

**PRINT STATEMENT** The PRINT statement actually generates the report defined by previous FDREPORT statements and operands on PRINT itself. FDREPORT will perform the PRINT using the characteristics specified on the preceding SELECT, REPORT, DEFAULT and/or SORT statements. A PRINT statement must be specified; multiple PRINT statements may be given to produce various reports in one execution of FDREPORT. All parameters which define the report to be generated (TITLE, HEADING, REPORT, SORT, SUMMARY, (X)SELECT, (X)EXCLUDE, and/or PUNCH) **must precede** the PRINT statement.

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## 53.32 CONTINUED . . .

OPERANDS	<b>ALTDATADDNAME=</b>	<p>Specifies the DD name of the file to be used for the input of FDREPORT internal records when RPTYPE=DATA (or COMPDATA) and DATATYPE=EXTRACT are <b>both</b> specified.</p> <p>Default is SYSUT1.</p>
	<b>ARCLIMIT=</b>	<p>When DATATYPE=ARCHIVE or CATARCH is specified, only data sets which were archived within the last "nnnn" days will be selected.</p> <p>Default is 0, which disables ARCLIMIT checking.</p>
	<b>BYTEFORMAT=</b>	<p>Specifies the units in which fields which represent a number of bytes are to be processed:</p> <p><b>BYTES</b> – actual bytes.</p> <p><b>KILOBYTES</b> – units of kilobytes (1000 bytes).</p> <p><b>MEGABYTES</b> – units of megabytes (1,000,000 bytes).</p> <p>The fields affected include: BYTES, PRIBYTES, SECBYTES, BYTESUSE, BYTESFRE (see Tables 1-8 in <a href="#">Section 53.36</a> for details). Kilo and megabytes will be in units of 1024 and 1048576 if ENABLE=HEXBYTES is in effect.</p> <p>For printing (REPORT statement), this operand affects both the units in which the field is printed and the width of the field in the report (10 columns for BYTES, 7 for KILOBYTES, 4 for MEGABYTES).</p> <p>The default is KILOBYTES.</p>
	<b>COPY=</b>	<p>When fields relating to ABR backup or archive information are included in the report, specifies which ABR copy (1 or 2) will appear in the report. Values are:</p> <p><b>1</b> – information about COPY 1 will be used.</p> <p><b>2</b> – information about COPY 2 will be used.</p> <p><b>EITHER</b> – COPY 1 information will be used, if a COPY 1 backup is recorded, otherwise COPY 2 will be used.</p> <p><b>BOTH</b> – both copies will be used (if both are cataloged). Will print 2 lines in the report.</p> <p>Default is COPY=EITHER.</p>
	<b>DATADDNAME=</b>	<p>Specifies the DD name of the file to be used for the output of FDREPORT internal records when RPTYPE=DATA is specified, or for the input of those records when DATATYPE=EXTRACT is specified.</p> <p>Default is SYSUT2.</p>

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## 53.32 CONTINUED . . .

**DATATYPE=**

Specifies the source of FDREPORT's input data. Values are:

**ARCHIVE** – read records from an archive control file. If an ARCHIVE DD statement is present, that archive control file will be read; otherwise the control file name specified in the ABR option table or by ARCDN= will be dynamically allocated.

**CATALOG** – data set records will be extracted from system catalogs.

**CATARCH** – data set records will be extracted from system catalogs; only those data sets cataloged for auto-recall will be selected. The extracted names will be used to select data sets from the Archive Control File (see ARCHIVE above).

**CATVTOC** – data set records will be extracted from system catalogs. The extracted names will be used to select data sets from the VTOCs of the volumes extracted from the catalog (see VTOC below).

**EXTRACT** – FDREPORT internal records will be read from the SYSUT2 DD statement. This data set must have been created by FDREPORT using RPTYPE=DATA in this step or a previous step or job. This may be used to produce several reports from the same set of data without the overhead of reconstructing that data.

**TVTOC** – information is extracted from a backup file created by FDR, FDRDSF, FDRABR, or SAR.

**VOLDATA** – volume summary data is gathered for selected volumes using LSPACE, VTOC, VTOCIX, and VVDS, creating a volume record.

**VTOC** – data set information will be read from the VTOCs and VVDSs of volumes selected.

Default is VTOC.

**DATEFORMAT=**

Specifies the format that dates will be printed in generated reports. Valid values are:

**YYDDD** – Julian format ("yy.ddd").

**YYYYDDD** – Julian format with 4-digit year ("yyyy.ddd").

**MMDDYY** – Gregorian format, month first ("mm/dd/yy").

**MMDDYYYY** – Gregorian format, month first with 4-digit year ("mm/dd/yyyy").

**DDMMYY** – Gregorian format, day first ("dd/mm/yy").

**DDMMYYYY** – Gregorian format, day first with 4-digit year ("dd/mm/yyyy").

If one of the Gregorian formats is chosen, then date fields will be 8 columns long in reports, instead of the 6 columns shown in the tables which follow. If a 4-digit year format is chosen, the date fields are an additional 2 bytes. This affects only printing; sorting is always in Julian ("yyyddd") format and selection operands can use Julian in either 2- or 4-digit year format.

Default is YYDDD (Julian format).

**DISABLE=**

The FDREPORT options specified are to be disabled for this run. Multiple options can be specified by enclosing the list in parentheses, separated by commas. Available options are described in [Section 53.35](#).

**DSKIP=**

Specifies the number of blank lines to be inserted between lines representing separate data sets (differs from SKIP= when multiple lines are required for one data set).

Default is 0.

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## 53.32 CONTINUED . . .

<b>ENABLE=</b>	The FDREPORT options specified are to be enabled for this run. Multiple options can be specified by enclosing the list in parentheses, separated by commas. Available options are described in <a href="#">Section 53.35</a> .
<b>EXTRACTDSNAME=</b>	Specifies the data set name of an existing data set to be used for FDREPORT extract data input (if DATATYPE=EXTRACT) or output (RPTYPE=DATA or COMPDATA). This data set will be dynamically allocated as DD name SYSUT2 (or whatever is specified by DATADDNAME=).
<b>EXTRACTMEMBER=</b>	Used in conjunction with EXTRACTDSNAME=. If the data set pointed to by EXTRACTDSNAME= is a PDS, this specifies a member name in that PDS to be used for input or output.
<b>FORMAT=</b>	<p>Specifies that the report is to be prepared using other than the default format selected by the program.</p> <p><b>PRT</b> – defaults to PAGEWIDTH=120 to generate a report formatted for printing.</p> <p><b>CRT</b> – defaults to PAGEWIDTH=78 to generate a report formatted for viewing on a terminal.</p> <p>The line length can be overridden by the PAGEWIDTH= operand.</p> <p>Default is CRT if executed under TSO, or PRT otherwise.</p>
<b>INDEXNUM=</b>	<p>Field name INDEX (see Table 5 in <a href="#">Section 53.36</a>) allows sorting, summary, etc., on an index level extracted from each data set name. INDEXNUM= specifies which index level is to be extracted (1 is first, 2 is second, etc.).</p> <p>The default is 1, the high-level index.</p>
<b>LBPZERO=</b>	<p>Specifies how a PS (sequential) data set whose last block pointer is all zeros is to be treated for used and free track calculations.</p> <p><b>VALID</b> means that such data sets are considered to have one track used and the rest free.</p> <p><b>INVALID</b> means they are considered to be entirely used and no tracks free.</p> <p>Since most access methods maintain a valid last block pointer in the Format 1 DSCB, LBPZERO=VALID will produce correct reports for almost all data sets so it is recommended.</p> <p>Default is INVALID.</p>
<b>LINECNT=</b>	<p>Specifies the maximum number of lines each report page can contain, from 28 to 99 inclusive.</p> <p>The default is 58 .</p>
<b>MAXGDG=</b>	<p>When reading from the system catalogs (RPTYPE=CATALOG, CATVTOC, or CATARCH), specifies the maximum number of generations of each GDG (Generation Data Group) that will be selected. Only the most recent "nnn" generations will be processed.</p> <p>The default is that all generations will be processed.</p>

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## 53.32 CONTINUED . . .

**MAXONLINE=** Specifies the maximum number of disk volumes which can be processed by this PRINT statement. The value can be from 5 to 9000. If the number of disk volumes selected exceeds this number, an error will occur. This is a special concern when using ENABLE=ONLINE in installations with large DASD installations.

The default is 256 disk volumes. However, if ENABLE=AUTOMAXON is in effect, MAXONLINE= will be automatically set to the number of disk volumes online to this system.

**OLDBACKUP=** when ABR backup information is requested, and old backups are being recorded, specifies which old backup information is to be printed. Values are:  
**(nn,...,nn)** – requests specific old backups. "nn" are numbers from 00 to 13 (00 being the most recent backup, 13 being the oldest).  
**ALL** – requests all old backups existing for a data set are to be printed.  
**CUR** – requests that only the current backup is to be printed.

If multiple backups exist and are requested for a data set, the report will contain multiple lines for the data sets.

Default is CUR.

**PAGEWIDTH=** Specifies the number of print positions (from 50 to 200) to be used in creating the report, excluding the printer control character in column 1. Heading lines and formatted data fields should fit within this limit. If the data fields requested exceed the PAGEWIDTH, FDREPORT will print all of the data which fits and display a warning message.

Default is 78 if FORMAT=CRT and 120 if FORMAT=PRT.

**NOTE:** PAGEWIDTH is ignored if the report is printed on SYSPRINT. ABRMAP must be present for PAGEWIDTH to be honored.

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## 53.32 CONTINUED . . .

**RPTYPE=**

Specifies the report type to be generated by FDREPORT, and can request certain predefined report formats or special processing. When predefined reports are requested, the REPORT and HEADING statements and the AUTOSTACK operand are ignored. Values are:

**ABRVTOC** – a report in standard ABR VTOC format (equivalent to PRINT VTOC) is printed.

**ARCHIVE** – a standard ABR ARCHIVE report (equivalent to PRINT ARCHIVE) is printed; intended for use with DATATYPE=ARCHIVE.

**DATA** – no report will be printed, but FDREPORT internal records for every data set or volume selected will be written to the extract data file on DD name SYSUT2. This data may be read as input to FDREPORT in this or another step (DATATYPE=EXTRACT) allowing multiple reports to be generated without the overhead of reconstructing the data. With RPTYPE=DATA, FDREPORT will include in the extract file **all** relevant data fields from its primary source specified by DATATYPE=; for example, if you specify DATATYPE=VTOC or CATVTOC, all fields generated from the VTOC and VVDS are available. If you need additional fields from another source, include a REPORT statement requesting at least one such field, e.g.,

```
REPORT FI ELD=(CATALOG, DI RBLOCKS)
```

which will gather ALL catalog and directory fields in addition to the VTOC/VVDS fields.

**COMPDATA** – similar to RPTYPE=DATA, except that **only** the fields named in a REPORT statement will be written to the extract file; this makes the extract file much smaller.

**GENERATE** – generates a customized report based on FDREPORT options (default).

**HEX** – prints records from the ARCHIVE control file (if DATATYPE=ARCHIVE) or records generated by FDREPORT (for all other data types) in a dump (hex and character) format.

**NONE** – suppresses the detail report, allowing only summaries to be printed (SUM=YES, SUM=INDEX or the SUMMARY statement should also be specified).

**OSVTOC** – a report containing information equivalent to an IEHLIST LISTVTOC statement (but not in the same format) is printed.

**SELPCH** – no report will be printed, but for each data set selected a statement will be written to SYSPUNCH in the format specified by the MASK operand of the PUNCH statement, or, by default, in the format:

```
SELECT VOL=vol ser, DSN=dsname
```

The SYSPUNCH data set may be passed to a following step, possibly a ABR step, allowing the enhanced selection facilities of FDREPORT to select data sets to be processed by ABR or other programs, or it may be submitted directly to a JES internal reader if a complete jobstream is generated by the punch mask. A SORT will be forced to properly handle multi-volume data sets unless SORT=NO is specified.

**TABLE** – generates output designed to be read by other programs. No titles will be printed and the report is not limited by the PAGEWIDTH operand. One set of column headings are printed unless DISABLE=HEADINGS is specified. Records up to 32760 bytes long may be created (depending on the characteristics of the ABRMAP data set). The ABRMAP DD is required, this report cannot go to SYSPRINT. Fields requested by the REPORT statement will appear in sequence with single columns between them.

**XREF** – a report in standard ABR VTOC/BACKUP XREF format (equivalent to PRINT BACKUP) is printed.

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## 53.32 CONTINUED . . .

- SKIP=** Specifies the number of blank lines to be inserted between report lines. The number can be a value from 0 (single space) to 3. The default is 0.
- SORT=** Specifies if the data is to be SORTed. However, sorting will be forced by a SORT statement and by some other options which require sorting.
- YES** – sorts by disk volume serial. If a SORT statement is present, and the first sort field is not VOL, VOL will be temporarily inserted as the first field. If no SORT is present, data is sorted by volume serial and data set name, both ascending.
- NO** – no sorting is performed. SORT statements and implied sorts are ignored.
- COMBINE** – if no SORT statement is present, sorts by data set name, volume sequence number, and volume serial number, all ascending, to produce a report sorted by data set name across all volumes. Ignored if a SORT statement is present.
- If sorting is required, any DD statements required by your installation's SORT product must be included in the FDREPORT step unless the SORTALLOC operand is specified.
- Default is NO unless a SORT statement precedes the PRINT statement or SUM or RPTYPE implies sorting.
- SORTALLOC=** If sorting is specified or forced, this specifies if FDREPORT will dynamically allocate some or all files required by your system sort product.
- NO** – do not dynamically allocate SORT related data sets. If sorting is required, any necessary DD statements must be included in the JCL.
- SORTLIB** – dynamically allocate the SORTLIB data set using the value in the operand SORTLIB for the dsname. Users of the SYNC SORT product should see the note under the SORTLIB= operand.
- SORTMSG** – dynamically allocate the SORT message output to SYSOUT using the value in the operand SORTMSGDDNAME for the ddname.
- SORTWORK** – dynamically allocate the number of SORTWKnn data sets specified in the operand WORKDDNAMES, using the value in the operand WORKUNIT as the unitname.
- YES** – dynamically allocate all of the above.
- CYL** – if SORTWKxx files are allocated, the allocation will be in cylinders.
- TRK** – if SORTWKxx files are allocated, the allocation will be in tracks. More than one option can be specified, in parentheses, separated by commas, e.g., SORTALLOC=(YES,CYL).
- Default is (NO,TRK).
- SORTCORE=** Specifies the amount of storage the program SORT is to use if external sorting is required. The number may be from 10000 to 8000000 inclusive. The default is taken from the FDR Global Option Table and is usually 100000.

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## 53.32 CONTINUED . . .

- SORTLIB=** Specifies the dataset name to be allocated to the DDNAME SORTLIB.  
The default is 'SYS1.SORTLIB'.
- NOTE for SYNCSORT users:** The SYNCSORT SORT product does not require a SORTLIB, so SYS1.SORTLIB may not exist on your system. If SORTALLOC=ALL is specified, FDREPORT will attempt to allocate it, and it may fail. To circumvent this, you can either create an empty PDS called SYS1.SORTLIB, or override the SORTLIB= operand to specify some other PDS.
- SORTMSGDDNAME=** Specifies the DDNAME to be used by the program SORT if messages are to be printed.  
The default is SYSOUT.
- SORTPFX=** Specifies the DDNAME prefix to be used by the program SORT if external sorting is required. If the string specified is less than 4 characters, a dollar sign(\$) fill character will be used.  
The default is taken from the FDR Global Option Table and is usually "SORT".
- SUM=** Controls the printing of summary reports, in conjunction with the SUMMARY statement. Summaries will be printed at indicated points in the detail report (on ABRMAP or SYSPRINT) unless an ABRSUM DD Statement is present, when the summary report will be printed on ABRSUM.  
**NO** – no summary reports are printed.  
**YES** – summary reports are printed as specified by the SUMMARY statement. If no SUMMARY is present, this is assumed:  
SUMMARY FIELD=(DSN,NOEXTENT,SIZE,SIZEFREE,SIZEUSED)  
**INDEX** – summary reports are printed for each high-level data set index encountered. The SUMMARY statement is honored, or if absent defaults as shown above. SUM=INDEX forces a sort on data set name unless SORT=NO is specified.  
Default is NO unless a SUMMARY statement precedes the PRINT statement.
- SUMDEVICE=** specifies how summaries by device type are to be handled if there is more than one density for the device.  
**BASE** – summary is at the base level, e.g., 3390-1, 3390-2, 3390-3 and 3390-9 are summarized as 3390.  
**UNIQUE** – summary is by individual device type, e.g., 3390-1, 3390-2, etc. will be summarized separately.  
Default is BASE.
- SYSUTSPACE=** Specifies the number of tracks or cylinders (controlled by the TRK and CYL operands of SORTALLOC=) to allocate when the temporary SYSUT2 extract file are dynamically allocated, from 10 to 1000.  
The default is 100.

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<b>WORKUNIT=</b>	<p>Specifies the unit name (1 to 8 characters) to use when dynamically allocating the temporary SYSUT2 extract file. It must be a value valid for UNIT= in JCL, and the volumes included on those units must include some in STORAGE or PUBLIC status for the allocation to be successful.</p> <p>The default is SYSALLDA which is valid on all MVS systems and includes all DASD devices.</p>
<b>TITLE=</b>	<p>Controls the placement of the title line within the current pagewidth. Values are:</p> <p><b>LEFT</b> – left aligned.</p> <p><b>CENTER</b> – centered within the pagewidth.</p> <p><b>RIGHT</b> – right aligned.</p> <p>Default is CENTER.</p>
<b>WORKDDNAMES=</b>	<p>Specifies the number of SORT work DDnames to allocate, from 1 to 5, inclusive.</p> <p>The default is 3.</p>
<b>WORKSPACE=</b>	<p>Specifies the number of tracks or cylinders (controlled by the TRK and CYL operands of SORTALLOC=) to allocate to each of the SORT work files, from 10 to 1000.</p> <p>The default is 100.</p>
<b>WORKUNIT=</b>	<p>Specifies the unit name (1 to 8 characters) to use when dynamically allocating sort work files if requested by SORTALLOC=. It must be a value valid for UNIT= in JCL, and the volumes included on those units must include some in STORAGE or PUBLIC status for the allocation to be successful.</p> <p>The default is SYSALLDA which is valid on all MVS systems and includes all DASD devices.</p>

## 53.33 FDREPORT CANCEL STATEMENT

**CANCEL**

**EXCLUDE**

**,HEADING**

**,REPORT**

**,SELECT**

**,SORT**

**,TITLE**

**CANCEL STATEMENT** The CANCEL statement negates the effects of all or some prior statement except DEFAULT. This statement is very handy if you have changed your mind about the selection criteria, sort fields, etc. or if you wish to generate a totally different report in the same FDREPORT execution.

If no operands are specified, CANCEL will cancel the effect of all of the prior statements except DEFAULT.

<b>OPERANDS</b>	<b>EXCLUDE</b>	Cancel the current exclusion criteria table as created by the EXCLUDE and XEXCLUDE statements.
	<b>HEADING</b>	Cancel the current HEADING line(s).
	<b>REPORT</b>	Cancel the current REPORT field table.
	<b>SELECT</b>	Cancel the current selection criteria table as created by the SELECT and XSELECT statements.
	<b>SORT</b>	Cancel the current SORT field table.
	<b>TITLE</b>	Cancel the current TITLE line.

## 53.34 FDREPORT EXECUTE STATEMENT

**EXECUTE****ECHO****,FDRLIB=**ddname**,REPORT=**reportname**EXECUTE  
STATEMENT**

The EXECUTE statement reads pre-established FDREPORT report statements from a control statement library. You can setup canned report specifications which any user can execute.

The control statements read by EXECUTE can also be combined with statements in the input stream. For example, you might have SELECT statements to select the data sets to be reported, followed an EXECUTE to read and execute the REPORT and PRINT statements defining the report.

The control statement library must be a data set that has the attributes: RECFM=FB,LRECL=80. It may be either sequential (DSORG=PS) or partitioned (DSORG=PO). The EXECUTE statement uses the presence or absence of the REPORT= operand to differentiate between sequential or partitioned data sets. If REPORT= is specified, the data set is assumed to be partitioned and REPORT= provides the member name. If REPORT= is omitted, the data set is assumed to be sequential.

**Note:** The ISPF SRS dialog, documented starting in [Section 56.40](#), is another way to save selection and/or formatting parameters in a library which can then be executed under TSO or submitted for batch execution.

**OPERANDS****ECHO**

Specifies that the control statements read are to be printed on SYSPRINT.

The default is the statements will not be printed.

**FDRLIB=**

Specifies the DD name FDREPORT is to scan for the control statements to be processed.

If REPORT is specified this DD must point to a partitioned data set. If REPORT is not specified FDREPORT will read this data set sequentially.

The format of this data set must be fixed blocked with an LRECL of 80. The blocksize is set at user discretion.

The default is FDRLIB.

**REPORT=**

Specifies the name of the report. This name must be a member in the library specified by FDRLIB. This member must contain the control statements defining this report in 80 byte images. The user can specify any of the FDREPORT statements in this member except for EXECUTE. If the last statement in the member is PRINT, the user need not specify any other control statements after this Statement.

If REPORT is not specified, FDREPORT will assume that the data set pointed by FDRLIB is a sequential data set.

A 1 to 8 character name may be specified.

## 53.35 FDREPORT EXECUTION OPTIONS

These are suboperands of the ENABLE= and DISABLE= operands on the PRINT and DEFAULT statements. They control various execution options of FDREPORT and invoke special functions. Because of space limitations, some options which are for special purposes and are of limited use are not documented here. To see the complete list of options, execute FDREPORT with the control statement:

```
HELP COMMAND(PRI NT)
```

The defaults shown for each option are the defaults distributed with FDREPORT. However, all of these defaults can be permanently changed as described under the DEFAULT statement in [Section 53.23](#).

<b>AIXCLUSTER</b>	for VSAM alternate indexes (AIXs) the name of the AIX cluster will be displayed as the cluster name instead of the base cluster name. Disabled by default.
<b>ALLFILTER</b>	when scanning the catalog (RPTYPE=CATALOG or CATVTOC or CATARCH), select data sets even if they are cataloged to tape or marked for ABR auto-recall. If disabled, only data sets cataloged to disk without auto-recall are selected. Disabled by default.
<b>AUTOFATDISK</b>	automatically determine if support for IBM 3390-9 DASD and other disks with more than 99999 tracks should be enabled; if any disk with over 99999 tracks is online, the FATDISK option is automatically enabled. Enabled by default.
<b>AUTOMAXON</b>	automatically determine the number of DASD volumes online to this processor and set the MAXONLINE= operand to default to that value. This enables you to report on any number of DASD volumes up to your entire DASD installation. Disabled by default.
<b>AUTOSTACK</b>	if the fields to be printed exceed the page width, fields with similar attributes will be printed stacked one above the other. Disabled by default.
<b>AVERAGING</b>	if summarization is requested, print the average value of all numeric summarized fields. Disabled by default.
<b>COMPSELECT</b>	if data set name selection does not select an ICF VSAM cluster based on the cluster name, the component names will also be checked; if any match the cluster is selected. Enabled by default.
<b>DAFREESPACE</b>	calculate free space in direct access (DSORG=DA) data sets. Disabled by default.
<b>DATELOCATE</b>	catalog LOCATEs will be issued to get creation/expiration dates for ICF VSAM clusters. Disabled by default.
<b>DATESTAMP</b>	report heading is to contain a date. Enabled by default, except disabled by default under TSO.
<b>DIAGNOSEVVDS</b>	when executing any FDREPORT function that accesses disk VTOCs, for volumes which have a VVDS, FDREPORT will check the VVDS for duplicate (more than one for same name) or orphan (not in VTOC) VVRs and NVRs. It will also display the IDCAMS statement necessary to correct the error, if possible. Disabled by default.
<b>DIRBLOCKS</b>	causes FDREPORT to read the directory of any selected PDS, even if directory-related fields have not been requested. Disabled by default, but assumed if directory fields are requested.
<b>DISPLAY</b>	can only be specified on a DEFAULT statement, and causes it to display all current FDREPORT operand and option defaults. Disabled by default.

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<b>DSCBDISPLAY</b>	displays the DSCBs read from VTOCs for all selected data sets. Disabled by default.
<b>DUPDSNCHECK</b>	during PUNCH processing, bypasses duplicate data set names, generating only one PUNCH output for each name; for multi-volume data sets and ICF VSAM clusters, ensures that only one output is generated per data set. It is effective only if the data is sorted by data set name. Enabled by default.
<b>FATDISK</b>	required for proper reporting when processing the IBM 3390-9 DASD or any other disk with more than 65535 tracks. This option will change the size of some of the fields to accommodate the larger disks. Disabled by default, but may be automatically enabled by the AUTOFATDISK option described above.
<b>FORMAT4DSCB</b>	request that the VTOC itself be identified by the name "FORMAT4.DSCB" in reports generated from the VTOC, rather than the default of "*****VTOC". Disabled by default.
<b>FOURBYTEUNIT</b>	requests that all device unit addresses be processed as 4-digit values as parameter input and in reports. Disabled by default, but enabled automatically if your system is running a level of MVS that supports 4-digit device addresses. This allows you to convert your reports to the new format even before that support is installed.
<b>GDGONLY</b>	when scanning the catalog (RPTYPE=CATALOG or CATVTOC or CATARCH), only generations of a GDG (Generation Data Group) are to be selected. Disabled by default.
<b>HEADINGS</b>	field column heading lines are to be included in the report. Enabled by default.
<b>HEXBYTES</b>	kilobyte and megabyte fields are to be based on division by 1024 (hex) rather than 1000 (decimal). Disabled by default.
<b>IAM</b>	FDREPORT will attempt to identify IAM files. IAM is a separately priced product from Innovation. Disabled by default.
<b>INDEX</b>	Extract an index level from the name of every data set for sorting purposes and other uses. The index level to be extracted (1, 2, etc.) is controlled by the INDEXNUM operand of the PRINT statement. The extracted index is available as the INDEX field name. Enabled by default.
<b>INFOMSG</b>	failure to process or select any data sets from a specified volume results in an informative message. Enabled by default.
<b>MODEL DSCB</b>	use the actual name of the ABR model DSCB in any report generated from a VTOC, instead of the "*****ABR" name. Disabled by default.
<b>MODOUTPUT</b>	when RPTYPE=DATA or COMPDATA is specified, open the output extract file (SYSUT2) with DISP=MOD (extend) in order to add data to the file. If disabled and DISP=MOD is not specified on the SYSUT2 DD statement, every PRINT with RPTYPE=DATA or COMPDATA will overwrite the extract file so that only the latest output is available. Disabled by default.
<b>ONLINE</b>	all online DASD volumes are to be processed. Disabled by default. If disabled, volumes specified by DISKxxxx DD statements, VOL, VOLG, and STORGRP operands, and volumes selected from the catalog, will be processed.
<b>PAGENUMBER</b>	report headings are to contain a page number. Enabled by default.

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## 53.35 CONTINUED . . .

<b>RESERVE</b>	VTOCs are protected from change by a RESERVE while being read. Disabled by default.
<b>RESETSELECT</b>	selection criteria will be reset after executing each PRINT statement. Disabled by default.
<b>RPTDUPDSNCHK</b>	during report generation, bypasses duplicate data set names, generating only one report line for each name. It is effective only if the data is sorted by data set name. Disabled by default.
<b>SELTERR</b>	set an error code if no data sets are selected (for DATATYPE=VOLDATA, if no volumes are selected). Enabled by default unless overridden in the FDR Global Option Table.
<b>TAPERREAD</b>	when DATATYPE=TVTOC is specified (to extract information from a FDR backup file), causes the <b>entire</b> backup to be read, collecting additional data about IAM files and directories of PDS data sets. If disabled, only the control records at the beginning of the backup are read, which generates all VTOC and VVDS related fields. Disabled by default.
<b>TIMESTAMP</b>	report heading is to contain a time. Disabled by default.
<b>VVRDISPLAY</b>	The VVDS records (VVRs for all VSAM clusters, and NVRs for non-VSAM SMS data sets) are displayed for all selected data sets. Disabled by default.

## 53.36 FDREPORT FIELD NAMES

**FIELD NAME TABLES** The following tables list the FIELDS which can be used in REPORT, SORT, (X)SELECT/(X)EXCLUDE, and SUMMARY statements as well as PUNCH masks and TITLE statements. All of the fields listed are valid on a REPORT statement. The tables show the following information for each FIELD:

**NAME** – The FIELD name. On a REPORT, SORT, or SUMMARY statement, specify the FIELD NAME in the FIELD= operand. In a PUNCH mask or TITLE statement, specify it where you want its value substituted, surrounded by the field prefix/suffix characters (e.g., <DSN>). On a SELECT/EXCLUDE statement, specify the FIELD NAME followed by an equal (=) sign and a value appropriate to the NAME (Ex: %CI=10). On a XSELECT/XEXCLUDE statement, the FIELD NAME may be followed by any of the operations supported (EX: %CI>10)

**DESCRIPTION** – A brief description of the field. For fields which represent attributes or flag bytes, the strings which are used in (X)SELECT/(X)EXCLUDE statements are shown, e.g., one of the values of CATALOG is YES so you may specify CATALOG=YES. For some such fields, the value is abbreviated in the report so the abbreviated printed value is shown in parentheses, e.g., under ARCFLAG2 it says RECALL (A), so you specify ARCFLAG2=RECALL, but in a report ARCFLAG2 will include A if the recall flag is set.

**LEN** – The number of print positions the field will occupy on the report.

**ATTR** – How the field will be displayed. There are three (3) types of fields: Character (CHAR), Numeric (NUM) and Hexadecimal (HEX). MIX indicates a combination of these types.

**SOURCE** – The source of the information displayed.

**VTOC** – DSCB of the data set.

**CAT** – system or ABR catalog.

**VVDS** – VVR or NVR in SYS1.VVDS.Vvolser.

**ARCH** – ABR archive control file.

**MODL** – ABR MODEL DSCB.

**IAM** – IAM control blocks.

**TRKC** – TRKCALC macro.

**DIRB** – PDS directory.

**FAMS** – SMS File Attribute Management Support.

**VTIX** – VTOC Index.

**SMS** – SMS

**GEN** – generated from one or more of the above sources.

**PUNCH/SORT** – These columns indicate whether the field is eligible for the specified statement. If an 'X' appears under the heading, it means the field can be specified on that statement. Fields valid for SORT can also be specified in a TITLE statement.

**SELECT** – A value in this column indicates that the field is eligible for the SELECT/EXCLUDE statements. If an 'E' appears in the column, the data set will be selected if the value in the file is EQUAL TO the value on the SELECT statement. If a 'G' appears in the column, the data set will be selected if the value is GREATER THAN or EQUAL TO the value on the SELECT statement.

**XSELECT** – A value in this column indicates that the field is eligible for the XSELECT/XEXCLUDE statements. If an 'E' appears in the column, only the equal (= or .EQ.) and not-equal (≠ or .NE.) comparisons may be used. If an 'A' appears, all comparisons supported by those statements may be used.

**SUMMARY** – A value in this column indicates that the field is eligible for the SUMMARY statement. If an 'C' (count) appears, then the number of unique occurrences of the value are simply counted. If a 'V' (value) occurs, each unique value of the field is displayed with the number of occurrences of that value. If a 'S' (sum) is displayed, then a total of all values of the field is displayed.

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## 53.36 CONTINUED . . .

TABLE 1 lists the FIELDs available from the data set's DSCB in the VTOC. If a VSAM cluster is being reported, some of the information may be found in the VVDS or catalog.					S E L E C T	X S E L E C T	P U N C H	S O R T	S U M M A R Y
NAME	DESCRIPTION	LEN	ATTR	SOURCE					
DSN	Data Set Name/VSAM component name	44	CHAR	VTOC	E	A	X	X	C
SPLDSN	Data Set Name on two lines	27	CHAR	VTOC					
SDSN	Data Set Name (First 20 bytes only)	20	CHAR	VTOC					
NAME	Data Set Name or VSAM Cluster Name	44	CHAR	VTOC/VVDS			X	X	
SPLNAME	Data Set Name or VSAM Cluster Name on two lines	27	CHAR	VTOC					
SNAME	Data Set Name or VSAM Cluster Name (First 20 bytes only)	20	CHAR	VTOC/VVDS					
DEFAULTS	Includes: SPLDSN,VOL,DSORG,RECFM, BLKSIZE,LRECL,SIZE,SIZEFREE,%FREE	72	MIX						
DSSN	Volume serial – stored in DSCB	6	CHAR	VTOC	E	A		X	
VOLSQ	Data Set Volume Sequence Number	3	NUM	VTOC	E	A		X	V
DATES	Includes: CRDATE,EXPDATE,LRDATE	*	NUM						
CRDATE	Creation Date	*	NUM	VTOC/CAT	G	A	X	X	V
EXPDATE	Expiration Date	*	NUM	VTOC/CAT	G	A	X	X	V
LRDATE	Last Reference Date	*	NUM	VTOC/VVDS	G	A	X	X	V
NOEPV	Number of Extents for Data Set	3	NUM	VTOC	G	A	X	X	S
NOBDB	Number of Bytes in Last Directory Block	3	NUM	VTOC	G	A	X	X	
SYSCODE	System Code Field in DSCB	13	CHAR	VTOC	E	A		X	
DCBINFO	Includes: DSORG,RECFM,BLKSIZE,LRECL	21	MIX						
DSORG	Data Set Organization: DA–BDAM PS– SEQUENTIAL AM– Non-ICF VSAM PO– PARTITIONED EF– ICF VSAM POE– PDSE U– UNMOVABLE UN– UNDEFINED PSE– PS Extended Format (Striped) HFS–Hierarchical File System (Open Edition) IAM– Innovation Access Method	3	CHAR	VTOC	E	E	X	X	V
RECFM	Record Format	5	CHAR	VTOC	E	E	X	X	V
OPTCD	Option Code Byte	2	HEX	VTOC	E	E	X	X	V
BLKSIZE	Data Set Block Size	5	NUM	VTOC/VVDS	E	A	X	X	V
LRECL	Data Set Logical Record Size	5	NUM	VTOC/VVDS	E	A	X	X	V
KEYLEN	Data Set Key Length	3	NUM	VTOC/VVDS	E	A	X	X	V
RKP	Data Set Relative Key Position	4	NUM	VTOC/VVDS	E	A	X	X	V
DSIND	Data Set Indicators - printed in hex; for selection use: LASTV - last volume (X'80') RACF - discrete profile (X'40') PASSA - read/write password (X'10') PASSW - write password (X'14') UPDAT - data set updates (X'02')	2	HEX	VTOC	E	E		X	V
SECALLOC	Secondary Allocation Quantity	8	NUM	VTOC/VVDS	E	A	X	X	V
SECAFLAG	Secondary Allocation Flags: BLK - allocated in blocks FIV - 5 largest extents (ALX) CYL - allocated in cylinders RND - rounded to cylinders TRK - allocated in tracks (ROUND) CON - contiguous (CONTIG) MAX - largest extent (MXIG)	5	CHAR	VTOC/VVDS	E	A	X	X	V
SECXFLAG	Secondary Allocation extension flag	3	CHAR	VTOC				X	V
SECXVALU	Secondary Allocation extension value	11	NUM	VTOC				X	V
LSTAR	Data Set Last Block Pointer; specify as LSTAR=X'ttttr'	6	HEX	VTOC	E	A		X	
TRKBAL	Data Set Track Balance; remaining bytes on last track used	5	NUM	VTOC	G	A		X	
EXTENTS	Data Set Extents; each extent will be stacked up to 123 extents may be printed	15* *	CHAR	VTOC		A			
EXTENTSX	Data Set Extents (with extent type) each extent will be stacked up to 123 extents may be printed	17* *	CHAR	VTOC					
CTFLD	Count Field of data set DSCB (CCHHR)	10	HEX	VTOC		A	X	X	
BPTR	Format 1 DSCB Pointer to Format 2/3 DSCB	10	HEX	VTOC				X	
LMJOB	Last Modifying JOB (for ASM2 users)	8	CHAR	VTOC		A		X	

\* the format and width of date fields varies depending on the value of the DATEFORMAT= operand.

\* \* these fields will be two columns larger if the FATDISK option is enabled.

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## 53.36 CONTINUED . . .

**TABLE 2** lists the FIELDS available from the VVDS or ICF catalog for ICF VSAM clusters. This is in addition to the FIELDS available from the VTOC (TABLE 1). For non-VSAM data sets, these fields will contain blanks.

Those fields that show a source of IAM are also valid for IAM files; those that show IAM+ are valid only for enhanced IAM files.

NAME	DESCRIPTION	LEN	ATTR	SOURCE	S E L E C T	X S E L E C T	P U N C H	S O R T	S U M M A R Y
CLUSTER	ICF VSAM Cluster Name	44	CHAR	VVDS	E	A	X	X	V
SPLCLS	ICF VSAM Cluster Name on two lines	27	CHAR	VVDS					
SCLUSTER	Cluster name (First 20 bytes only)	20	CHAR	VVDS	E				
VSAMID	Includes: SPLCLS,SPLDSN,VOLSER	62	CHAR						
VSAMINFO	Includes: DSORG,RECFM,MAXLRECL,LRECL,CISIZE,TRKSCA,CICA,%CI,%CA,COMPATTR	68	MIX						
VSAMUSE	Includes: RECORDS,RETRIEVE,UPDATES,INSERTS,DELETES,HIALORBA,HIUSERBA,CISPLIT,CASPLIT	85	NUM						
TIMES	Includes: CRTIME,LRTIME	17	NUM						
CRTIME	Time of creation (hh.mm.ss)	8	NUM	VVDS/IAM				X	
LRTIME	Time of last reference (hh.mm.ss)	8	NUM	VVDS/IAM				X	
CATNAME	Name of the Catalog	44	CHAR	VVDS/IAM	E	A		X	V
%CA	Free Percent in Control Area (CA)	3	NUM	VVDS/IAM	G	A	X	X	V
%CI	Free Percent in Control Interval (CI)	3	NUM	VVDS/IAM	G	A	X	X	V
CICA	Number of Control Intervals per CA	3	NUM	VVDS	G	A	X	X	V
CISIZE	Control Interval (CI) Size	5	NUM	VVDS/IAM	E	A	X	X	V
BUFSIZE	VSAM Buffer Size	6	NUM	VVDS	E	A	X	X	V
MAXLRECL	VSAM Maximum Record Length	5	NUM	VVDS/IAM	E	A	X	X	V
TRKSCA	VSAM Number Tracks per Control Area	3	NUM	VVDS	G	A	X	X	
COMPTYPE	VSAM Component type: DATA– Base cluster data      INDEX– Base cluster index AIXDATA (AIXDA) – Alternate Index data AIXINDEX (AIXIN) – Alternate Index index	5	CHAR	VVDS		E		X	
COMPATTR	VSAM Component Attributes INX– Indexed      RUS– Reusable      KRNG– Key Range NUMD– Relative      RCVY– Recovery      SPED– Speed IMBD– Imbedded      NIDX– non-Indexed      ERAS– Erase ORD– Ordered      WCK– Write Check SPND– Spanned      REPL– Replicate	24	CHAR	VVDS			X		
AMDATTR	VSAM Cluster Attributes from AMDSB: ESDS (ES) IMBED (IM) KEYRANGE (KE) KSDS (KS) ORDERED (OR) RRDS (RR) REPLICATE (RE) SPANNED (SP) WRITECHECK (WR)	24	CHAR	VVDS/IAM		E		X	
AMDATTR3	VSAM Cluster Attributes from AMDSB: LINEAR (LI) LOADED (LO) NONUNIQUE (NO) SHRBCS (SH) – shared catalog      VARIABLE (VA) - Variable RRDS	24	CHAR	VVDS/IAM		E		X	
AIXATTR	Attribute of Alternate Index: AIX – this is an AIX UPGRADE - AIX with the UPGRADE attribute	7	CHAR	VVDS		E		X	V
SHROPT	VSAM Share Options	3	CHAR	VVDS/IAM			X		V
PRIALLOC	VSAM Primary Allocation Quantity	8	NUM	VVDS/IAM	E	A	X	X	V
HIALORBA	VSAM High Allocated Relative Byte Address	10	NUM	VVDS/IAM+	G	A	X	X	
HIKEYRBA	VSAM High Key Relative Byte Address	10	NUM	VVDS/IAM+	G	A	X	X	
HIUSERBA	VSAM High Used Relative Byte Address	10	NUM	VVDS/IAM+	G	A	X	X	
EXCPEXIT	VSAM Exception Exit	8	CHAR	VVDS	E	A			V
OWNER	VSAM Owner Identification	8	CHAR	CAT	E	A	X	X	V
TIMESTMP	VSAM Time Stamp	16	HEX	VVDS/IAM				X	
CASPLIT	Number of Control Area (CA) Splits	5	NUM	VVDS	G	A	X	X	S
CISPLIT	Number of Control Interval (CI) Splits	5	NUM	VVDS	G	A	X	X	S
INDEXLEV	VSAM Number of Index Levels	5	NUM	VVDS		A	X	X	V
EXCPS	VSAM Number of EXCPs	10	NUM	VVDS	G	A	X	X	S
DELETES	VSAM Number of Records Deleted	10	NUM	VVDS/IAM	G	A	X	X	S
INSERTS	VSAM Number of Records Inserted	10	NUM	VVDS/IAM	G	A	X	X	S
RECORDS	VSAM Number of Records in Cluster	10	NUM	VVDS/IAM	G	A	X	X	S
RETRIEVE	VSAM Number of Records Retrieved	10	NUM	VVDS	G	A	X	X	S
UPDATES	VSAM Number of Records Updated	10	NUM	VVDS/IAM	G	A	X	X	S
VSFREBYT	VSAM Number of Bytes Free	10	NUM	VVDS	G	A		X	S
CATVRBA	Relative Byte Address of VVR from catalog	8	HEX	CAT	G	A	X	X	V
VVRVRBA	Actual Relative Byte Address of VVR in VVDS	8	HEX	VVDS	G	A		X	V

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## 53.36 CONTINUED . . .

<b>TABLE 3</b> lists the additional FIELDS available for a data set on a SMS-managed volume. For non-SMS data sets, these fields will be blank.					S E L E C T	X S E L E C T	P U N C H	S O R T	S U M M A R Y
NAME	DESCRIPTION	LEN	ATTR	SOURCE					
SMSCLASS	Includes: STORCLAS,DATACLAS,MGMTCLAS	26	CHAR						
STORCLAS	SMS Storage Class	8	CHAR	VVDS		E	X	X	V
MGMTCLAS	SMS Management Class	8	CHAR	VVDS		E	X	X	V
DATACLAS	SMS Data Class	8	CHAR	VVDS		E	X	X	V
STORGRP	SMS Storage Group on which the data set resides	8	CHAR	GEN		E	X	X	V
SMSFLAGS	SMS flag byte in DSCB: MANAGED (S) - SMS-managed NOBCS (N) - not cataloged REBLOCK (R) - reblockable DADSMCRT (D) - DADSM assigned blksize PDSE (I) - PDS Extended PDSEX (X) - HFS (Hierarchical File Sys) STRIPE (Z) - Extended Format (EF) ATTREXTN (E) - Extended Attribute (EA)	4	CHAR	VTOC		E		X	V
LASTBKUP	SMS last backup Date and Time (HSM)	13	CHAR	VVDS		A		X	
NVSAMATR	SMS NONVSAM Attributes: ACTGDG - active GDG generation DEFGDG - deferred GDG generation ROLGDG - rolled-out GDG generation PDSE - PDS Extended POSIX - HFS (Open Edition/MVS)	6	CHAR	VVDS		E		X	V
STRIPECT	Stripe Count, for Extended Format (EF)	3	CHAR	VVDS				X	V
RECOVDTA	SMS Recovery Data	8	CHAR	VVDS		E		X	V
RESOROWN	SMS Resource Ownership	16	CHAR	VVDS		E		X	V
SUBCFLAG	SMS Subcell Flag Byte	17	CHAR	VVDS		E		X	V
SUBCVERS	SMS Subcell Version Number	3	NUM	VVDS		A		X	V

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## 53.36 CONTINUED . . .

<b>Table 4</b> lists data set backup information from the ABR system. If DATATYPE=ARCHIVE was specified, this information is from the archive control file, otherwise it is from the ABR backup subsystem. If COPY= or OLDBACKUP= was specified, there may be more than one line of this information available; REPORT will list them on multiple lines, SELECT/XSELECT will test against all copies of the fields.					S E L E C T	X S E L E C T	P U N C H	S O R T	S U M M A R Y
NAME	DESCRIPTION	LEN	ATTR	SOURCE					
ABRGEN	Current ABR Generation Number	4	NUM	MODL	E	A	X	X	V
ARBCYCLE	Current ABR Cycle Number	3	NUM	MODL	E	A	X	X	V
ABRIND	ABR Indicators: A - Always backup/never archive B - Current ABR backup exists N - Normal backup/never archive R - Archive requested X - Exclude from ABR processing For reports only, not for selection: C - No current ABR backup exists M - Multi-volume data set T - Old backup recording is enabled U - Updated since last ABR backup	5	CHAR	VTOC	E	E		X	V
ADATE	Archive Date	*	NUM	ARCH	G	A	X	X	V
ATIME	Archive time (hhmmss, Application Bkup)	6	NUM	ARCH	G	A	X	X	V
ADAYS	# days since Archive	5	NUM	ARCH	G	A	X	X	V
ARCDSN	Archive Control File name	44	CHAR	GEN			X		V
ARCFLAGS	Includes: ARCFLAG1, ARCFLAG2								
ARCFLAG1	ARCHIVE control file flag 1 - FIVEVOL (F) - backup over 5 volumes MULTIVOL (M) - multi-vol data set RESTORED (R) - restored from ARCHIVE	5	CHAR	ARCH		E		X	V
ARCFLAG2	ARCHIVE control file flag 2 - CLUSTER (C) - entry for ICF cluster DELETE (D) - entry flagged for deletion NOTCAT (N) - backup not cataloged RECALL (A) - archived for auto-recall	5	CHAR	ARCH		E		X	V
ARCTTR	TTR used for auto recall	6	HEX	ARCH		A	X	X	V
ACTTTR	Actual TTR of record in ARCHIVE ctl file	6	HEX	ARCH		A	X	X	V
BKINFO	Includes: BKDATE,BKSUFFIX,BKFILENO,BKVOL	*	CHAR						
TVTOCDSN	Input Backup dsn, for RPTYPE=TVTOC	44	CHAR	GEN			X	X	V
OLDBKUP	ABR Old Backup # of ABR backup displayed	2	NUM	GEN				X	V
BKCYCLE	Cycle # of ABR backup displayed	3	NUM	CAT		A	X	X	V
BKGEN	Generation # of ABR backup displayed	4	NUM	CAT		A	X	X	V
BKDATE	Backup Date	*	NUM	CAT	G	A	X	X	V
BKDAY	# days since Backup	5	NUM	CAT	G	A	X	X	V
BKEXDATE	Backup or Archive expiration date	*	NUM	ARCH/CAT		A	X	X	V
BKEXDAY	# days until expiration of Backup or Archive	5	NUM	ARCH/CAT		A	X	X	V
BKFILENO	File Seq Number of Backup or Archive	4	NUM	ARCH/CAT	E	A	X	X	V
BKSUFFIX	Backup or Archive Data Set Name Suffix. This is the last index level in the name	8	CHAR	ARCH/CAT	E	A	X	X	V
BKTAPCNT	Number of Backup or Archive Volumes	2	NUM	ARCH/CAT	E	A	X		V
BKVOL	Volume Serials for the Backup/Archive (5)	34	CHAR	ARCH/CAT	E	A	X	X	V
BKXVOL	Volume Serials for the Backup/Archive (20)	139	CHAR	ARCH/CAT	E	A			V
BKDEVCLS	Device class of backup (TAPE or DISK)	4	CHAR	ARCH/CAT			X	X	V
BKDEV TYP	Device type of backup	7	CHAR	GEN		E	X	X	V

\* the format and width of date fields varies depending on the value of the DATEFORMAT= operand.

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## 53.36 CONTINUED . . .

TABLE 5 lists the FIELDS which can be generated by ABR from information contained in the VTOC, Catalog or the VVDS.					S E L E C T	X S E L E C T	P U N C H	S O R T	S U M M A R Y
NAME	DESCRIPTION	LEN	ATTR	SOURCE					
SIZEINFO	Includes: SIZE, SIZEFREE, %FREE	15 *	NUM						
SIZE	Size of the Data Set in Tracks	5 *	NUM	GEN	G	A	X	X	S
BYTES	Size of the Data Set in bytes/KB/MB	* *	NUM	GEN		A	X	X	S
MAXSIZE	Maximum size of Data Set in Tracks if all secondary allocations taken	5 *	NUM	GEN	G	A	X	X	S
SIZEFREE	Number of Tracks Unused for Data Set – PS, PO and VSAM actual free tracks – all others zero (0)	5 *	NUM	GEN	G	A	X	X	S
BYTESFRE	Bytes unused in the Data Set	* *	NUM	GEN		A	X	X	S
SIZEUSED	Number of Tracks Used for Data Set – PS, PO and VSAM actual used tracks – all others total allocated space	5 *	NUM	GEN	G	A	X	X	S
BYTESUSE	Bytes used in the Data Set	* *	NUM	GEN		A	X	X	S
BLKSTRK	Number of Blocks per Track	5	NUM	VVDS/TRKC	G	A	X	X	V
BYTESTRK	Bytes per Track (BLKSIZE times BLKSTRK)	5	NUM	GEN		A	X	X	V
PRIBYTES	Bytes in primary allocation (ICF VSAM only)	* *	NUM	GEN		A	X	X	S
SECBYTES	Bytes/KB/MB size of secondary allocation	* *	NUM	GEN		A	X	X	S
TRACKCAP	Max Track Capacity of Device in Bytes	5	NUM	VTOC			X	X	V
CAPBYTES	Bytes size of allocated space if used at track capacity	* *	NUM	GEN		A	X	X	S
%FREE	Percentage of Free Space in Data Set	3	NUM	GEN	G	A	X	X	V
%USED	Percentage of Used Space in Data Set	3	NUM	GEN	G	A	X	X	V
%CAPUSED	Percentage of Capacity Utilization (based on allocation and BLKSIZE)	3	NUM	GEN		A	X	X	V
CATALOG	Indicates if Data Set is Cataloged This can be expensive to collect if a large number of data sets are to be reported. YES – cataloged to this volume NO – not cataloged at all ERR – cataloged to another volume ONL – only cataloged, not in VTOC UNK – error reading catalog	3	CHAR	CAT	E	E		X	V
CATTTR	DSCBTTR from Catalog (used by ABR to indicate auto recall)	6	HEX	CAT			X	X	X
CATVOL	Volume to which data set is cataloged	6	CHAR	CAT			X	X	X
CATVOLCT	Number of volumes to which the data set is cataloged	3	NUM	CAT		A	X	X	V
CRDAYS	Number of days since creation	5	NUM	GEN	G	A	X	X	V
EXPDAYS	Number of days until expiration	5	NUM	GEN	G	A	X	X	V
LRDAYS	Number of days since last reference	5	NUM	GEN	G	A	X	X	V
NOEXTENT	Number of Extents Used for Data Set	3	NUM	GEN	G	A	X	X	S
PROTECT	Reports on Type of Protection indicates if RACF or PASSWORD protected	4	CHAR	VTOC				X	V
RUNDATE	Date of FDREPORT execution	* * *	NUM	GEN		A	X	X	V
RUNTIME	Time of FDREPORT execution (hh.mm.ss)	8	NUM	GEN			X	X	
VOL	Volume Serial Data Set resides on	6	CHAR	VTOC	E	A	X	X	V
FILESEQ	File Sequence Number (tape only)	4	NUM	CAT		A	X	X	
UNIT	Device address the data set is on	3/4	CHAR	GEN		A	X	X	V
DEVTYPE	Type of Device Data Set resides on	7	CHAR	GEN	E	E	X	X	V
DEVCLASS	Class of Device Data Set resides on, "TAPE" or "DISK"	4	CHAR	GEN			X		V
UCBID	4-byte UCB device type	8	HEX	CAT/UCB			X		V
INDEXNUM	# of Index Level in the data set or cluster name that is extracted into field INDEX	3	NUM	USER			X	X	V
INDEX	Extracted level from data set or Cluster name	8	CHAR	DSN/CLUS			X	X	V

\* the width of the size (in tracks) fields will be 6 if the FATDISK option is enabled.

\* \* the format and width of byte fields varies depending on the value of the BYTEFORMAT= operand.

\* \* \* the format and width of date fields varies depending on the value of the DATEFORMAT= operand.

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## 53.36 CONTINUED . . .

TABLE 6 lists the FIELDS which can be obtained from the directory of a Partitioned Data Set or an Extended Partitioned Data Set (via FAMS).					S E L E C T	X S E L E C T	P U N C H	S O R T	S U M M A R Y
NAME	DESCRIPTION	LEN	ATTR	SOURCE					
DIRBINFO	Includes: DIRBLOCK,DIRBFREE,%DIRFREE		NUM						
DIRBLOCK	Number of PDS Directory Blocks	5	NUM	DIRB/FAMS		A	X	X	V
DIRBFREE	Number of Free PDS Directory Blocks	5	NUM	DIRB/FAMS		A	X	X	V
DIRBUS	Number of used PDS Directory Blocks	5	NUM	DIRB/FAMS		A	X	X	V
%DIRFREE	Percentage of PDS Directory Blocks not used	3	NUM	GEN		A	X	X	V
%DIRUSED	Percentage of PDS Directory Blocks in use	3	NUM	GEN		A	X	X	V
MEMBERS	Number of members in PDS	6	NUM	DIRB/FAMS		A	X	X	S

TABLE 7 lists the FIELDS available from IAM data set Control Block for IAM datasets. This is in addition to the FIELDS available from the VTOC (TABLE 1) and the fields that are normally reserved for VSAM.					S E L E C T	X S E L E C T	P U N C H	S O R T	S U M M A R Y
NAME	DESCRIPTION	LEN	ATTR	SOURCE					
IAMINFO	Includes: DSORG,RECFM,MAXLRECL, LRECL, BLKSIZE, CFSIZE	33	MIX						
IAMUSE	Includes: RECORDS,UPDATES,INSERTS, DELETES,OVERFLOW,OVERUSED,%OVER	69	NUM						
IAMINDIC	IAM Indicators: ENHANCED (E) - Enhanced IAM format DATACOMP (D) - Data compressed KEYCOMP (K) - Keys compressed	5	CHAR	IAM		E		X	V
%PRIMEXT	Used Percent of the Prime Extension	3	NUM	IAM		A	X	X	V
PRIMEXTN	Number of Prime Extension Blocks allocated	8	NUM	IAM		A	X	X	S
PRIMEUSE	Number of used Prime Extension Blocks	8	NUM	IAM		A	X	X	S
%OVER	Used % of the Independent Overflow records	3	NUM	IAM		A	X	X	V
OVERFLOW	# of Independent Overflow records allocated	10	NUM	IAM		A	X	X	S
OVERUSED	# of used Independent Overflow records	10	NUM	IAM		A	X	X	S

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## 53.36 CONTINUED . . .

TABLE 8 lists the FIELDS which can be obtained from the volume-level record. Data is gathered and summarized from the LSPACE SVC, VTOC, VTOC index, and VVDS.					S E L E C T	X S E L E C T	P U N C H	S O R T	S U M M A R Y
NAME	DESCRIPTION	LEN	ATTR	SOURCE					
VLDEFAULT	Volume report defaults, includes: VOL, DEVTYPE, UNIT, VLINDSTA, VLUSEATR, VLTRKVOL, VLALOTRK, VL%UTRKS, VLFREETRK, VLLRGCYL, VTVTOCTR, VTDSCB1 and VL%UDSCB		CHAR		E	A	X	X	V
VLVOLSER	Volume Serial Data Set resides on	6	CHAR	VTOC	E	A	X	X	V
VLUNIT	Device address the volume is on	3/4	CHAR	GEN		E	X	X	V
VLDEVTyp	Type of Device Data Set resides on	7	CHAR	GEN	E	E	X	X	V
VL%FTRKS	Percentage of disk volume free	3	NUM	VTOC		A	X	X	V
VL%UTRKS	Percentage of disk volume in use	3	NUM	VTOC		A	X	X	V
VL%FDSCB	Percentage of DSCBs free within the VTOC	3	NUM	VTOC		A	X	X	V
VL%UDSCB	Percentage of DSCBs used within the VTOC	3	NUM	VTOC		A	X	X	V
VL%FINDX	Percentage of VTOC Index Records free	3	NUM	VTIX		A	X	X	V
VL%UINDX	Percentage of VTOC Index Records used	3	NUM	VTIX		A	X	X	V
VL%FVVDS	Percentage of VVDS Control Intervals free	3	NUM	VVDS		A	X	X	V
VL%UVVDS	Percentage of VVDS Control Intervals used	3	NUM	VVDS		A	X	X	V
VLALOCYL	Number of Allocated Cylinders	5	NUM	VTOC		A	X	X	S
VLALOTRK	Number of Allocated Tracks	5 *	NUM	VTOC		A	X	X	S
VLALOBYT	Number of Allocated Bytes	* *	NUM	VTOC		A	X	X	S
VLAVGTRK	Average File Size in Tracks	5 *	NUM	VTOC		A	X	X	V
VLAVGBYT	Average File Size in Bytes	* *	NUM	VTOC		A	X	X	V
VLBYTRK	Track Capacity in bytes	5	NUM	DEVT			X	X	V
VLCLVOL	Number of Cylinders per Volume	5	NUM	DEVT			X	X	S
VLTRKCYL	Number of Tracks per Cylinder	3	NUM	DEVT			X	X	V
VLBYTCYL	Number of Bytes per Cylinder	* *	NUM	DEVT			X	X	V
VLTRKVOL	Number of Tracks per Volume	5 *	NUM	DEVT			X	X	S
VLBYTVOL	Number of Bytes per Volume	* *	NUM	DEVT			X	X	S
VLDIRBTR	Number of PDS Directory Blocks per Track	3	NUM	DEVT			X	X	V
VLDSCBTR	Number of VTOC DSCBs per Track	3	NUM	DEVT			X	X	V
VLDSCB	Total Number of DSCBs	5 *	NUM	VTOC		A	X	X	S
VLDSCBU	Number of Used DSCBs	5 *	NUM	VTOC		A	X	X	S
VLDSCB0	Number of FORMAT-0 DSCBs	5 *	NUM	VTOC		A	X	X	S
VLDSCB1	Number of FORMAT-1 DSCBs	5 *	NUM	VTOC		A	X	X	S
VLDSCB2	Number of FORMAT-2 DSCBs	5 *	NUM	VTOC			X	X	S
VLDSCB3	Number of FORMAT-3 DSCBs	5 *	NUM	VTOC		A	X	X	S
VLDSCB4	Number of FORMAT-4 DSCBs	5	NUM	VTOC			X	X	S
VLDSCB5	Number of FORMAT-5 DSCBs	5	NUM	VTOC			X	X	S
VLDSCB6	Number of FORMAT-6 DSCBs	5	NUM	VTOC			X	X	S
VLDSCB7	Number of FORMAT-7 DSCBs	5	NUM	VTOC			X	X	S
VLD SOAM	Number of non-ICF VSAM Data Spaces	5 *	NUM	VTOC		A	X	X	S
VLD SODA	Number of Direct Access data sets	5 *	NUM	VTOC		A	X	X	S
VLD SOEF	Number of ICF/VSAM Components	5 *	NUM	VTOC		A	X	X	S
VLD SOIS	Number of Indexed Sequential data sets	5 *	NUM	VTOC		A	X	X	S
VLD SOPO	Number of Partitioned data sets	5 *	NUM	VTOC		A	X	X	S
VLD SOPOE	Number of PDSE data sets (SMS volumes)	5 *	NUM	VTOC		A	X	X	S
VLD SOPS	Number of Physical Sequential data sets	5 *	NUM	VTOC		A	X	X	S
VLD SOUN	Number of data sets with an Unknown data set Organization	5 *	NUM	VTOC		A	X	X	S
VLFRAGIN	IBM Fragmentation Index	4	NUM	LSPC		A	X	X	V
VLFRECYL	Number of Unused Cylinders	5	NUM	LSPC		A	X	X	S

\* the width of these fields will be 6 if the FATDISK option is enabled.

\* \* the format and width of byte fields varies depending on the value of the BYTEFORMAT= operand and the FATDISK option.

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## 53.36 CONTINUED . . .

TABLE 8 — CONTINUED . . .					S E L E C T	X S E L E C T	P U N C H	S O R T	S U M M A R Y
NAME	DESCRIPTION	LEN	ATTR	SOURCE					
VLFREEEXT	Number of Unused Extents	5*	NUM	LSPC		A	X	X	S
VLFRETRK	Number of Unused Tracks	5*	NUM	VTOT		A	X	X	S
VLFREVC	Number of Unused VVDS Control Intervals	5	NUM	VVDS		A	X	X	S
VLUSEVC	Number of Used VVDS Control Intervals	5	NUM	VVDS			X	X	S
VLTOTVC	Total Number of VVDS Control Intervals	5	NUM	VVDS			X	X	S
VLFREVR	Number of Unused VTOC Index Records	5	NUM	LSPC		A	X	X	S
VLUSEVR	Number of Used VTOC Index Records	5	NUM	GEN			X	X	S
VLTOTVR	Total Number of VTOC Index Records	5	NUM	GEN			X	X	S
VLINDSTA	Status of Indexed VTOC ACTIVE – Indexed VTOC Active NONE – No Indexed VTOC YES – Indexed VTOC Not Active	6	CHAR	LSPC		E		X	V
VLMOUSTA	Volume Mount Status RESERVED – Volume Dismountable RESIDENT – Volume Not Dismountable	8	CHAR	UCB				X	V
VLUSEATR	Volume Use Attribute PRIVATE – Allocated if specific PUBLIC – Temporary non-specific STORAGE – Non-temporary non-specific	7	CHAR	UCB		E		X	V
VLSMSTAT	Volume SMS State INITIAL – Volume Initialized for SMS MANAGED – Volume SMS Managed NONE – No SMS Processing	7	CHAR	VTOT		E		X	V
VLSMSVST	Volume SMS Status ENABLED NONE (non-SMS) QUIESCED ALL QUIESCED NEW DISABLED ALL DISABLED NEW	12	CHAR	SMS				X	V
VLSMSGST	Volume SMS Storage Group Status (same values as VLSMSTAT)	12	CHAR	SMS				X	V
VLLRGCYL	Number of Cylinders in Largest Free Extent	5	NUM	LSPC		A	X	X	S
VLLRGTRK	Number of Tracks in Largest Free Extent	5*	NUM	LSPC		A	X	X	S
VLLRGBYT	Number of Bytes in Largest Free Extent	**	NUM	LSPC		A	X	X	S
VLUSERS	Number of Current Allocations to Volume	5	NUM	UCB		A		X	S
VLVTIXTR	Number of Tracks Allocated to the VTOC Index	5	NUM	VTOT		A		X	S
VLVTOTCTR	Number of Tracks Allocated to VTOC	5	NUM	VTOT		A		X	S
VLVVDSSTR	Number of Tracks Allocated to VVDS	5	NUM	VTOT		A		X	S
VLVVDSXT	Number of Extents Allocated to VVDS	3	NUM	VTOT		A		X	S

\* the width of these fields will be 6 if the FATDISK option is enabled.

\*\* the format and width of byte fields varies depending on the value of the BYTEFORMAT= operand and the FATDISK option.



**53.40 FDREPORT VTOC EXAMPLES**

This section shows examples which read the VTOCs of selected volumes directly (DATATYPE=VTOC, which is the default).

A sample of the generated report is shown after each example; because of space limitations it may be condensed. In examples where SORTing is required, SORTALLOC=YES has been specified to dynamically allocate required SORT files; in your installation you may have to provide SORT JCL.

**REPORT ON PREFIX** FDREPORT is to report on all data sets starting with the hi-level index "ABC" on any online volume. The default report (See Section 53.27) is to be printed. No sorting is to be done; a separate page will be generated for data sets selected from each disk volume. Messages about volumes for which no data sets were selected are suppressed. The report will be done to SYSPRINT.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRINT    DD    SYSOUT=*
//SYSIN       DD    *
              TITLE  LINE=' ABC DATA SETS ON VOLUME <VOL>'
              XSELECT XDSN=ABC. **
              PRINT   ENABLE=ONLINE, DISABLE=INFOMSG
```

The generated report will look like:

**ABC DATA SETS ON VOLUME ABC123**

DATA SET NAME	VOLSER	D/S ORG	RECFM	BLKSZ	LRECL	ALLOC	FREE	%FR
ABC. FIDMAC. LIST	ABC123	PS	FB	3120	80	1	0	0
ABC. JCL. CNTL	ABC123	PO	FB	6160	80	5	2	40

**REPORT TSO LIST DATA SETS** FDREPORT is to report on all data sets residing on online volumes starting with "TSO" whose last qualifier is "LIST" or "OUTLIST" and which have not been referenced in 2 or more days. Only the data set name, volume, and date of last use are to be printed. A standard summary is to be printed for each volume processed.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRINT    DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//ABRSUM      DD    SYSOUT=*
//SYSIN       DD    *
              TITLE  LINE=' TSO LIST AND OUTLIST DATA SETS'
              XSELECT XDSN=( *. LIST, *. OUTLIST ),
                          VOLG=TSO, LRDAY51
              REPORT  FIELD=(DSN, VOL, LRDATE)
              PRINT   SUM=YES
```

The generated report will look like:

**TSO LIST AND OUTLIST DATA SETS**

DATA SET NAME	VOLSER	LRDATE
USER1. SPFTMP1. LIST	ABC123	96. 134
USER3. PRT. OUTLIST	ABC321	96. 257

The summary will look like:

```
SUBTOTAL -- VOL -----ABC123
DSN-----5 NOEXTENT-----8 SIZE----75 SI ZEFREE---12 SI ZEUSED---62
FINAL TOTALS
DSN----56 NOEXTENT--117 SI ZE-- 352 SI ZEFREE--106 SI ZEUSED--246
```

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## 53.40 CONTINUED . . .

**VSAM REPORT** FDREPORT is to report on selected ICF VSAM clusters on all online volumes whose serial number starts with 'PROD'. A variety of VSAM fields will be reported (many others are available). ENABLE=AUTOSTACK allows FDREPORT to stack fields with like attributes in order to fit the fields within the pagewidth of 80 characters. All selected clusters will be combined into one report, sorted on cluster name and component name within cluster.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
              TITLE  LINE=' VSAM I NFO FOR SELECTED CLUSTERS'
              SELECT  DSG=(I PCS, MVS, M211), DSORG=EF, VOL=PROD*
              REPORT  FI ELD=(CLUSTER, DSN, VOL, RECORDS,
                          I NSERTS, DELETES, EXCPS, %CI , %CA,
                          BUFSI ZE, CI SI ZE, CI CA)
              SORT    FI ELD=(CLUSTER, DSN)
              PRI NT  ENABLE=AUTOSTACK, SORTALLOC=YES, PAGEWI DTH=80
```

The generated report will look like:

**VSAM INFO FOR SELECTED CLUSTERS**

CLUSTER NAME DATA SET NAME	VOLSER	RECORDS I NSERTS DELETES EXCPS	%CI %CA	BUFSI CI SI Z	CI CA
USER1. KSDS	ABC123	290	10	9216	150
USER1. KSDS. DATA		340	20	4096	
		25			
		267			
USER1. KSDS	ABC456	1	0	0	31
USER1. KSDS. I NDEX		0	0	1024	
		0			
		20			

**REPORT ON ABR BACKUPS** FDREPORT is to report on the current ABR backup for all data sets with the index of 'PAYROLL'. The page width is expanded to 132 characters. Associated DSCB information is also requested. All online volumes beginning with certain prefixes are to be searched. The report will be sorted by DSN. The summary will show all ABR backup volumes required to restore all of the payroll data sets, which might be useful as a tape pick list.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//ABRSUM      DD    SYSOUT=*
//SYSI N      DD    *
              TITLE  LINE=' PAYROLL BACKUP REPORT'
              REPORT  FI ELD=(SPLDSN, VOL, LRDATE, DSORG, RECFM,
                          BLKSI ZE, LRECL, SI ZE, SI ZEUSED, BKI NFO)
              SELECT  DSG=PAYROLL, VOL=(PAY*, PROD*)
              SUMMARY  FI ELD=(BKVOL)
              PRI NT  PAGEWI DTH=132, SORT=COMBI NE, SORTALLOCATE=YES
```

The generated report will look like:

**PAYROLL BACKUP REPORT**

DATA SET NAME	VOLSER	...	BKDATE	BKSUFFI X	BKUP FI LE	TAPE VOLUME(S)
PAYROLL. FI LE1	PAY001	...	96. 304	C1028400	4	BV1048, BV1050
PAYROLL. FI LE2	PROD23	...	96. 308	C1027902	19	BV1056

The summary will look like:

```
FI NAL TOTALS
VALUE SUMMARY OF BKVOL --- TOTAL NUMBER OF VALUES-----17
BKVOL-----BV1044 ( 1) BV1048 ( 3) BV1050 ( 3)
```

CONTINUED . . .

## 53.40 CONTINUED . . .

**EXECUTE PREDEFINED REPORT** FDREPORT is to execute a report which has been set up in advance. The name of this report is VTOCREP1, which is a member in the data set USER.REPORT. This member contains a TITLE, REPORT and PRINT **statements**. The user supplies a SELECT or XSELECT statement to identify the data sets to be included; in this example, all data sets starting with USER and a numeric digit are selected.

Predefined reports are useful for end-users who have little knowledge of FDREPORT; report formats and controls can be predefined by others and executed by end-users. The FDRLIB members can also contain SELECT statements so that they can be entirely self-contained.

```
//CANREPT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT     DD    SYSOUT=*
//ABRMAP        DD    SYSOUT=*
//FDRLIB        DD    DSN=USER. REPORT, DI SP=SHR
//SYSIN         DD    *
                XSELECT  DSN=USER+. **
                EXECUTE   REPORT=VTOCREP1
```

If VTOCREP1 contains

```
TI TL E        LI NE=' VTOC REPORT 1'
REPORT         FI ELD=( SPLDSN, VOL, SI ZE I NFO)
PRI NT         DATATYPE=CATVTOC
```

then those data sets will be selected from the catalog, VTOC information extracted, and the report will look like:

**VTOC REPORT 1**

DATA SET NAME	VOLSER	ALLOC	FREE	%FR
USER2. JCL. CNTL	TS0123	10	3	30
USER1. I SPF. I SPPROF	LI BR12	3	0	0

**REPORT ON POORLY BLOCKED DATA SETS** FDREPORT is to report on all data sets which are using less than 70% of the maximum track capacity for the device they reside on. Generally this will be data sets with small block sizes, or block sizes over a half-track (which waste the rest of the track). The tests on block size and size (tracks) are to eliminate data sets for which no meaningful capacity calculation can be done.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSIN       DD    *
                TI TL E        LI NE=' POORLY BLOCKED DATA SETS'
                XSELECT      %CAPUSED. LT. 70, SI ZE. GT. 0, BLKSI ZE. GT. 0
                REPORT       FI ELD=( DSN, VOL, BLKSI ZE, DEVTYPE,
                BLKSTRK, BYTESTRK, TRACKCAP, %CAPUSED)
                SUMMARY      FI ELD=( DSN, BLKSI ZE)
                PRI NT       ENABLE=ONLI NE, DI SABLE=I NFOMSG
```

The generated report will look like:

**POORLY BLOCKED DATA SETS**

DATA SET NAME	VOLSER	BLK SZ	DEVTYPE	BLKS TRK	BYTTK	TRCAP	%CP
SYS1. PARMLI B	SYSRES	80	3380	83	6640	47476	14
XYZ. JCL. CNTL	TS0123	800	3380	36	28800	47476	61
YZX. SEQ. DS	PROD01	28672	3380	1	28672	47476	61

The summary will report by volume, and total for all volume in the form:

```
DSN-----25
VALUE SUMMARY OF BLKSI ZE --- TOTAL NUMBER OF VALUES-----3
BLKSI ZE--- 80 ( 1) 160 ( 17) 25000 ( 7)
```

CONTINUED . . .

## 53.40 CONTINUED . . .

**SELECT BY FILTER** FDREPORT is to select any online data set that contains a 3-character first level qualifier that starts with the letter 'T' and contains the character string 'YM' anywhere within any qualifier other than the first. Only data sets between 100 and 200 tracks in size will be included. The report will be sorted by dsname within volume, and will be in standard ABR VTOC format (See the PRINT VTOC statement in [Section 53](#)).

```
//REPORT      EXEC   PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSI N      DD     *
      XSELECT   XDSN=T//. **YM**, SI ZE. GE. 100, SI ZE. LE. 200
      PRI NT    ENABLE=ONLI NE, RPTYPE=ABRVTOC, SORT=YES, SORTAL-
LOC=YES
```

The generated report will look like:

## ABR VTOC LIST OF VOLUME SERIAL NUMBER TEST01 -- DEVICE TYPE 3380

DATA SET NAME	VOLUME SERI AL	LS CY	VOL SEQ	LAST REF DATE	ABR IND	EXTENT CT	DESCR I PTORS CCC-HH	CCC-HH
TST. NYMASTER	TEST01	00	001	96. 150		1	0296-00	0308-14
TU1. ONLYM. ZEBRA	TEST01	02	001	96. 320	U	2	1250-00 0303-00	1252-14 0303-14

**REPORT ON IAM FILES** FDREPORT is to select all online IAM data sets and print statistics about them (see Table 7 in [Section 53.36](#)).

IAM is a product from Innovation which provides a high-performance data-compressed transparent alternative for many VSAM clusters. Contact Innovation for more information.

```
//REPORT      EXEC   PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSI N      DD     *
      TI TLE    LI NE=' I AM STATI STI CS'
      XSELECT   DSORG=I AM
      REPORT    FI ELD=(DSN, VOL, SI ZE, I AMUSE)
      PRI NT    ENABLE=ONLI NE, ENABLE=I AM
```

The generated report will look like:

## IAM STATISTICS

DATA SET NAME	VOLSER	ALLOC	RECORDS	OVERFLOW	OVERUSED	%OF
POLI CY. MASTER	PROD23	2500	42155	2000	23	2

**REPORT ON ENHANCED IAM FILES** FDREPORT is to select all enhanced IAM data sets on production volumes and print information about them (see Table 2 in [Section 53.36](#)).

```
//REPORT      EXEC   PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD     SYSOUT=*
//ABRMAP      DD     SYSOUT=*
//SYSI N      DD     *
      TI TLE    LI NE=' ENHANCED I AM DATA SETS'
      XSELECT   DSORG=I AM, I AMI NDI C=ENHANCED
      REPORT    FI ELD=(DSN, VOL, SI ZE, HI ALORBA, HI USERBA)
      PRI NT    ENABLE=(ONLI NE, I AM)
```

CONTINUED . . .

## 53.40 CONTINUED . . .

**IDENTIFY FULL PARTITIONED FILE** FDREPORT is to locate all partitioned (PO) data sets on TSO volumes and report those that have less than 5 percent free space in the data set or the directory.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
               TITLE  LINE=' ALMOST FULL TSO PDS DATA SETS'
               XSELECT DSORG=(PO), VOL=TSO*, %FREE<5
               XSELECT DSORG=(PO), VOL=TSO*, %DI RFREE<5
               REPORT  FI ELD=(SPLDSN, VOL, SI ZEI NFO, DI RBI NFO)
               PRI NT
```

The generated report will look like:

ALMOST FULL TSO PDS DATA SETS							
DATA SET NAME	VOLSER	ALLOC	FREE	%FR	DI RBK	DI RFB	%DF
-----	-----	-----	-----	---	-----	-----	---
USER1. JCL. CNTL	TS0123	30	1	3	25	23	92
USER1. I SPF. PROF	TS0123	5	2	40	25	1	4

**REPORT SAME DATA TWO WAYS** FDREPORT is to report on data sets on a set of disk volumes, once for all data sets sorted by name within volume, and once for only ICF VSAM sorted by cluster name for all volumes together, reporting different fields in each report. To reduce overhead by reading the VTOCs only once, RPTYPE=DATA is used to generate a file of FDREPORT internal records on SYSUT2, then that data is read twice to produce the two reports.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSUT2      DD    UNI T=SYSDA, SPACE=(CYL, (20, 5), RLSE)
//SYSI N      DD    *
               DEFAULT  SORTALLOC=YES
*   SELECT ALL DATA WI THOUT REPORT
               SELECT   VOL=PROD*
               PRI NT    RPTYPE=DATA
*   GENERATE REPORT 1
               TITLE    LINE=' LI STI NG OF PRODUCTI ON VOLUMES'
               REPORT    FI ELD=(DSN, DSORG, DATES, SI ZE, EXTENTS)
               PRI NT    DATATYPE=EXTRACT, SORT=YES
*   GENERATE REPORT 2
               CANCEL    SELECT
               TITLE     LINE=' LI STI NG OF PRODUCTI ON VSAM'
               SELECT     DSORG=EF
               REPORT     FI ELD=(CLUSTER, DSN, VOL, DATES, SI ZEI NFO)
               SORT       FI ELD=(CLUSTER)
               PRI NT     DATATYPE=EXTRACT
```

CONTINUED . . .

## 53.40 CONTINUED . . .

**REPORT  
POORLY  
ORGANIZED  
VSAM  
CLUSTERS**

FDREPORT is to report on all ICF VSAM clusters over 3 Megabytes in size with more than 5 CA splits or more than 20 CI splits, and all clusters with over 16 extents, since all these might be candidates for reorganization. Clusters with the highest CA splits will be listed first.

**Note:** FDRREORG, a separately priced component, may be used to automate the reorganization of such clusters as well as IAM files and PDSs. [See Section 30](#) for more information.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
              DEFAULT SORTALLOC=YES, BYTEFORMAT=MEGABYTES
              TI TLE  LI NE=' VSAM CLUSTERS I N NEED OF REORG'
              XSELECT DSORG=EF, BYTES>3M, CASPLI T>5
              XSELECT DSORG=EF, BYTES>3M, CI SPLI T>20
              XSELECT DSORG=EF, NOEXTENT>16
              SORT     FI ELD=(CASPLI T, CI SPLI T), SEQUENCE=(D, D)
              REPORT   FI ELD=(CLUSTER, VOL, PRI ALLOC, BYTES,
                          BYTESUSE, CASPLI T, CI SPLI T, NOEXTENT)
              PRI NT    ENABLE=ONLI NE
```

The generated report will look like:

VSAM CLUSTERS IN NEED OF REORG							
CLUSTER NAME	VOLSER	PRALO	MBYT	MBUS	CASPL	CI SPL	EXT
-----	-----	-----	-----	-----	-----	-----	---
MASTER. FI LE	PROD12	32	22	22	42	175	5
PERM. HI STORY	PROD99	15	125	120	3	27	25

**REPORT DATA  
SETS LIKELY  
TO GET Sx37**

FDREPORT is to identify data sets likely to get Sx37 (out of space) ABENDs or the equivalent VSAM error. All data sets with less than 10% free space are reported if they have no secondary allocation, or if they have 13 or more extents (50 or more for VSAM).

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
              TI TLE  LI NE=' DATA SETS WHICH MAY RUN OUT OF SPACE'
              XSELECT SECALLOC. EQ. 0, %FREE. LT. 10
              XSELECT DSORG. NE. EF, NOEXTENT. GE. 13, %FREE. LT. 10
              XSELECT DSORG. EQ. EF, NOEXTENT. GE. 50, %FREE. LT. 10
              REPORT   FI ELD=(DSN, DSORG, SECALLOC, %FREE, NOEXTENT, SI ZE)
              PRI NT    ONLI NE
```

The generated report will look like:

DATA SETS WHICH MAY RUN OUT OF SPACE						
DATA SET NAME	D/S ORG	VOLSER	SCALO	%FR	EXT	ALLOC
-----	---	-----	-----	---	---	-----
MASTER. FI LE	EF	PROD12	10	7	72	780
PROD. CNTL. CARDS	PO	SYS123	0	3	1	20

CONTINUED . . .

## 53.40 CONTINUED . . .

**DIAGNOSE  
PROBLEMS  
IN VVDS**

FDREPORT is to check the VVDS on specified volumes, reporting on all duplicate records (more than one VVR or NVR for the same data set or component) and orphan records (a VVR or NVR with no corresponding DSCB in the VTOC). Such errors may cause failures when accessing these data sets. Although the DIAGNOSE function of IDCAMS can do the same checks, there is no easy way to do multiple volumes; also, FDREPORT is faster than IDCAMS.

```
//REPORT      EXEC   PGM=FDREPORT, REGI ON=OM
//SYSPRI NT    DD     SYSOUT=*
//SYSI N       DD     *
                SELECT VOL=(TST*, PROD*, SMS*)
                PRI NT  RPTYPE=NONE, ENABLE=DI AGNOSEVVDS
```

When errors are found, FDREPORT will print:

```
ORPHANED VVR ON VOLUME TST089 AT RBA 00002511 WITHIN VVDS SYS1.VVDS.VTST089
<dump format print of the VVR>
  REMOVE ORPHANED VVR WITH:
    //STEPXX EXEC PGM=IDCAMS
    //SYSPRINT DD SYSOUT=*
    //DD1      DD UNIT=SYSALLDA,DISP=SHR,VOL=SER=TST089
    //SYSIN     DD *
    DELETE TST.VSAM.TEST3.INDEX -
      FILE(DD1) VVR CATALOG(CATALOG.TSOUSER)
    //
FDR421  ICF LOCATE ERROR -- MULTIPLE VVRS (02) ON VOLUME TST089  -- DSN=TST.VSAM.TEST1.DATA
```

## 53.41 FDREPORT ARCHIVE EXAMPLES

This section shows examples which read an ARCHIVE Control File (DATATYPE=ARCHIVE).

A sample of the generated report is shown after each example; because of space limitations it may be condensed. In examples where SORTing is required, SORTALLOC=YES has been specified to dynamically allocate required SORT files; in your installation you may have to provide SORT JCL.

**REPORT ON EXPIRING DATA SETS** FDREPORT is to report on all data sets in the archive control file which will expire within the next 30 days, showing information about the location of both archive copies if both exist.

```
//REPORT      EXEC   PGM=FDREPORT, REGI ON=OM
//SYSPRI NT    DD     SYSOUT=*
//ABRM MAP     DD     SYSOUT=*
//ARCHI VE     DD     DSN=FD RABR. ARCHI VE, DI SP=SHR
//SYSI N       DD     *
               TITLE   LI NE=' ARCHI VED FI LES EXPI RI NG WI TH I N 30 DAYS'
               XSELECT  BKEXDAYS<31
               REPORT   FI ELD=( DSN, VOL, BKEXDATE, BKI NFO)
               PRI NT    DATATYPE=ARCHI VE, COPY=BOTH, SORT=YES, SORTALLOC=YES
```

The generated report will look like:

**ARCHIVED FILES EXPIRING WITHIN 30 DAYS**

DATA SET NAME	VOLSER	BKEDAT	BKDATE	BKSUFFI X	BKUP FI LE	TAPE VOLUME(S)
USER1. FI LE1	TS0001	96. 304	95. 304	B191304A	2	BA1234
		96. 304	95. 304	B291304A	5	BA5432
USER2. JCL. CNTL	TS0023	96. 308	95. 308	B191308B	12	BA1234

**SELECTIVE ARCHIVE REPORT** FDREPORT is to report on all ARCHIVED data sets which have one of several hi-level indexes, summarized by index. A standard archive report is to be printed. The ARCHIVE Control File whose name is in the ABR option table is to be dynamically allocated and processed. See PRINT ARCHIVE in [Section 53](#) for a sample of the report format.

```
//REPORT      EXEC   PGM=FDREPORT, REGI ON=OM
//SYSPRI NT    DD     SYSOUT=*
//ABRM MAP     DD     SYSOUT=*
//SYSI N       DD     *
               DEFAULT  SORT=COMBI NE, SUM=I NDEX, COPY=BOTH
               SELECT   DSG=( FI NANCE. , PAYROLL. , LEDGER. )
               PRI NT    DATATYPE=ARCHI VE, RPTYPE=ARCHI VE, SORTALLOC=YES
```

**REPORT ON SHORT-TERM DATA SETS** FDREPORT is to report on all ARCHIVED data sets which were ARCHIVED within the last 2 weeks but which have already been recalled. This might be used to identify data sets which should not have been ARCHIVED in the first place.

```
//REPORT      EXEC   PGM=FDREPORT, REGI ON=OM
//SYSPRI NT    DD     SYSOUT=*
//ABRM MAP     DD     SYSOUT=*
//SYSI N       DD     *
               TITLE   LI NE=' ARCHI VED DATA SETS RECALLED WI TH I N 14 DAYS'
               DEFAULT  DATEFORMAT=MMDDYYYY
               XSELECT  ARCFLAG1=RESTORED, BKDAYS<15
               REPORT   FI ELD=( DSN, VOL, DSORG, SI ZE, BKDATE, ARCFLAGS)
               PRI NT    DATATYPE=ARCHI VE
```

The generated report will look like:

**ARCHIVED DATA SETS RECALLED WITHIN 14 DAYS**

DATA SET NAME	VOLSER	D/S ORG ALLOC	BKDATE	ARFL1	ARFL2
USER1. FI LE1	TS0001	PS 22	10/20/1996	R	A
USER2. JCL. CNTL	TS0023	PO 150	10/22/1996	R	



## 53.42 FDREPORT CATALOG EXAMPLES

This section shows examples which read the system catalogs. FDREPORT can be directed to gather more information about the cataloged data sets from the VTOCs of the volumes in the catalog (DATATYPE=CATVTOC) or from the ARCHIVE Control File (DATATYPE=CATARCH).

You may also report strictly on the catalog information (DATATYPE=CATALOG) but in this case a very limited set of fields are available.

A sample of the generated report is shown after each example; because of space limitations it may be condensed. In examples where SORTing is required, SORTALLOC=YES has been specified to dynamically allocate required SORT files; in your installation you may have to provide SORT JCL.

**IDENTIFY  
MULTI-  
VOLUME  
DATA SETS**

Identify all data sets which are cataloged to more than one volume. Because of the way that FDREPORT reads the catalogs, the report is naturally sorted by data set name.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
              TITLE  LINE=' MULTI - VOLUME DATA SETS'
              XSELECT CATVOLCT>1
              REPORT  FI ELD=(DSN, VOL, CATVOLCT)
              PRI NT  DATATYPE=CATALOG
```

The generated report will look like:

**MULTI-VOLUME DATA SETS**

DATA SET NAME	VOLSER	CVC
PROD. MV. FI LE	PROD11	2
PROD. MV. FI LE	PROD22	2

**REPORT  
RECENT TEST  
DATA SETS**

FDREPORT is to report on the size of the non-VSAM data sets that have the character string 'TEST' anywhere within their dsname, and that were created within the last two weeks. The data set names will be selected from the system catalogs, then the volumes from the catalog will be accessed to get the rest of the information. The tracks allocated, %FREE, data set name and volume serial are to be printed, sorted by size in descending sequence.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
              TITLE  LINE=' RECENTLY CREATED TEST DATA SETS'
              REPORT  FI ELD=(SI ZE, %FREE, DSN, VOL)
              SORT    FI ELD=(SI ZE) , SEQUENCE=(D)
              XSELECT XDSN=**TEST**, CRDAYS. LE. 14, DSORG. NE. EF, CATALOG=YES
              PRI NT  SORTALLOC=YES, DATATYPE=CATVTOC
```

The generated report will look like:

**RECENTLY CREATED TEST DATA SETS**

ALLOC	%FR	DATA SET NAME	VOLSER
450	95	USER1. TEST. JCL	TS0001
295	12	TEST. GL. MASTER1	TEST12

## 53.43 FDREPORT SMS EXAMPLES

FDREPORT has many uses in a system with SMS (System Managed Storage) active. These are some examples of ways it can be used to aid in the management of an SMS system.

**REPORT BY MANAGEMENT CLASS** FDREPORT is to report on all online SMS-managed data sets whose SMS management class is TSO1. The data set name, volume, and the SMS class names are to be reported.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
              TI TLE  LI NE=' MANAGEMENT CLASS TSO1'
              XSELECT MGMTCLAS=TSO1
              REPORT  FI ELD=(DSN, VOL, SMSCLASS)
              PRI NT  ENABLE=ONLI NE
```

The generated report will look like:

MANAGEMENT CLASS TSO1				
DATA SET NAME	VOLSER	STORCLAS	DATA CLAS	MGMTCLAS
-----	-----	-----	-----	-----
USER1. TEST. JCL	SMS002	TEST		TSO1
USER3. I SPF. PROF	TS0123	TSO	PROFI LE	TSO1

**SUMMARIZE BY STORAGE CLASS** FDREPORT is to scan on all online SMS-managed data sets (STORCLAS.NE.' ' will select SMS data sets since they must all have an assigned storage class), and produce only summaries showing all storage class names in use, and the number of data sets and the number of tracks allocated to those data sets in each class.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRSUM      DD    SYSOUT=*
//SYSI N      DD    *
              TI TLE  LI NE=' SMS STORAGE CLASS SUMMARY'
              XSELECT STORCLAS. NE. ' '
              SORT    FI ELD=( STORCLAS), BREAK=(Y)
              SUMMARY FI ELD=( STORCLAS, DSN, SI ZE)
              PRI NT  ENABLE=ONLI NE, RPTYPE=NONE,
                      DI SABLE=I NFOMSG, SORTALLOC=YES
```

The summary will look like:

```
SUBTOTAL -- STORCLAS-- GS812
          DSN-----2    SI ZE----75
SUBTOTAL -- STORCLAS-- PROddb
          DSN----27    SI ZE--4250
```

CONTINUED . . .

## 53.43 CONTINUED . . .

**REPORT BY STORAGE GROUP** FDREPORT is to report on all data sets in two specific SMS storage groups. For PDS (PO) and PDSE (POE) data sets, member counts are displayed.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
               TI TLE  LI NE=' SMS STORAGE GROUPS PROD AND TEST'
               XSELECT STORGRP=( PROD, TEST)
               SORT    FI ELD=( STORGRP, DSN)
               REPORT  FI ELD=( SPLDSN, STORGRP, VOL, DSORG, LRDATE, SI ZE,
                           MEMBERS)
               PRI NT  SORTALLOC=YES
```

The generated report will look like:

**SMS STORAGE GROUPS PROD AND TEST**

DATA SET NAME	STORGRP	VOLSER	D/S ORG	LRDATE	ALLOC	MEMBER
PAYROLL. MASTER	PROD	PROD02	PS	96. 305	750	0
PROD. CARD. CNTL	PROD	PROD12	POE	96. 301	30	27

**PREPARE FOR SMS CONVERSION** FDREPORT is report on data sets that are ineligible for SMS conversion, so that they can be manually handled. Ineligible data sets are ISAM, non-ICF VSAM, unmovable and uncataloged data sets. CATALOG=NO selects uncataloged data sets, while CATALOG=ERR selects those cataloged to another volume. In the report, the catalog status is printed, as well as the volume to which the data set is cataloged, if any.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
               TI TLE  LI NE=' DATA SETS I NELI GI BLE FOR SMS'
               XSELECT DSORG=( U, I S, AM) , DSORG. NE. EF, VOLG=TSO
               XSELECT CATALOG=NO, VOLG=TSO
               XSELECT CATALOG=ERR, VOLG=TSO
               REPORT  FI ELD=( DEFAULTS, CATALOG, CATVOL)
               PRI NT
```

**53.44 FDREPORT VOLUME EXAMPLES**

This section shows examples which produce volume-level reports (DATATYPE=VOLDATA). Available fields are in Table 8 in [Section 53.36](#).

**VOLUME USAGE REPORT** FDREPORT is to report on the percentage of the volume allocated, plus percentage used for the VTOC, VTOCIX, and VVDS, for all PROD volumes.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
               TITLE  LINE=' PRODUCTION VOLUME USAGE'
               SELECT  VOL=PROD*
               SORT    FIELDS=(VLVOLSER)
               REPORT  FIELDS=(VLVOLSER, VLUNIT, VLDEVTYP, VL%UTRKS,
                               VL%UDSCB, VL%UINDX, VL%UVVDS)
               PRINT   SORTALLOC=YES, DATATYPE=VOLDATA
```

The generated report will look like:

PRODUCTION VOLUME USAGE						
VOLSER	UAD	DEVTYPE	%TU	%DU	%I U	%VU
PROD07	143	3380	37	42	12	45
PROD12	148	3380	76	17	6	15

**VOLUME STATUS REPORT** FDREPORT is to report on the mount, usage, and SMS status of every online volume.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
               TITLE  LINE=' VOLUME STATUS REPORT'
               REPORT  FIELDS=(VLVOLSER, VLUNIT, VLDEVTYP,
                               VLUSEATR, VLMOUSTA, VLSTAT, VLSMSVST)
               PRINT   ENABLE=ONLINE, DATATYPE=VOLDATA
```

The generated report will look like:

VOLUME STATUS REPORT						
VOLSER	UADR	DEVTYPE	USEATTR	MOUNT	SMS STA	VOLUM STATUS
TS0123	0252	3380	STORAGE	RESIDENT	NONE	NONE
DBLRG1	3175	3390	PRIVATE	RESIDENT	MANAGED	ENABLED

**IDENTIFY DISABLED INDEXED VTOCS** FDREPORT is to identify volumes which have an Indexed VTOC (VTOCIX) which has been disabled. A status of YES indicates that the VTOCIX exists but is not active.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//SYSI N      DD    *
               TITLE  LINE=' DISABLED VTOC INDEXES'
               XSELECT VLI NDSTA=YES
               REPORT  FIELDS=(VLVOLSER, VLI NDSTA)
               PRINT   ENABLE=ONLINE, DATATYPE=VOLDATA
```

The generated report will look like:

DISABLED VTOC INDEXES	
VOLSER	VTOCIX
TS0123	YES
DBLRG1	YES

CONTINUED . . .

## 53.44 CONTINUED . . .

**VOLUME  
STATISTICS  
FOR IMPORT**

FDREPORT is to generate statistics for all online volumes in a tabular format for import into another program. If this is done at regular intervals, the other program might be used to keep a history of the values, generating history, statistical and trend reports. You might also download the report file to a PC for analysis by PC-based programs. The tabular format will contain no titles or page breaks; it will contain one set of headings unless DISABLE=HEADINGS is specified as shown.

```
//REPORT      EXEC   PGM=FDREPORT, REGI ON=OM
//SYSPRI NT    DD     SYSOUT=*
//ABRMAP       DD     DSN=SYSTEMS. VOL-
STAT(+1), UNI T=DI SK, SPACE=( TRK, 3), DI SP=( , CATLG)
//SYSI N       DD     *
      XSELECT      VLI NDSTA=YES
      REPORT       FI ELD=(VLVOLSER, VLUNI T, VLDEVTYP, VLTRKVOL,
                        VLALOTRK, VLDSCB1)
      PRI NT       ENABLE=ONLI NE, DATATYPE=VOLDATA, DI SABLE=HEADI NGS
```

The generated file will look like:

```
TS0123 1A3 3390-3 50085 25173    236
MVSRES 1C7 3380-K 39825 37900    1274
```

The program which reads the file must, of course, be aware of the meaning and position of each column.

CONTINUED . . .

## 53.45 FDREPORT PUNCH EXAMPLES

This section shows examples of generating JCL and control cards using FDREPORT data fields (RPTYPE=SELPCH).

**GENERATE  
ABR  
STATEMENTS**

FDREPORT is to be used as a front-end filter for ABR, selecting data sets to be scratched by SUPERSCRATCH. All data sets whose last index level begins with "LIST" or "TEMP" will be scratched, if they were created more than 1 day ago. FDREPORT will generate ABR control statements in the default format:

```
SELECT DSN=dsname, VOL=volume
```

and write them to the SYSPUNCH temporary data set, which is read by the following ABR step.

```
//SELECT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT    DD    SYSOUT=*
//SYSPUNCH     DD    DSN=&&ABRI N, UNI T=SYSDA, SPACE=(TRK, (2, 1)),
//             DI SP=(NEW, PASS), DCB=BLKSI ZE=6160
//SYSI N       DD    *
//             XSELECT XDSN=( *. LI ST*, *. TEMP*), CRDAYS>1
//             PRI NT   ENABLE=ONLI NE, RPTYPE=SELPCH
//SUPERSCR     EXEC  PGM=FDABR, COND=(0, NE, SELECT)
//SYSPRI NT    DD    SYSOUT=*
//SYSPRI N1    DD    SYSOUT=*
//TAPE1        DD    DUMMY
//SYSI N       DD    *
//             DUMP     TYPE=SCR, ONLVOL, DSNENQ=USE, MAXCARDS=1000
//             DD      DSN=&&ABRI N, DI SP=(OLD, DELETE)
```

**GENERATE  
ABR RESTORE  
SELECTS**

FDREPORT is to generate a data set containing SELECT statements specifying the dsn, volume, and ABR generation and cycle for each selected data set, using a punch mask. This might be used at a disaster/recovery site to do data set restores of selected data sets from their most recent ABR backup.

```
//PUNCHMSK     EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT    DD    SYSOUT=*
//SYSPUNCH     DD    DSN=SELPCH. OUTPUT, UNI T=3490, DI SP=(, CATLG),
//             DCB=BLKSI ZE=6160
//SYSI N       DD    *
//             XSELECT XDSN=PAYROLL. **
//             PUNCH   FDRLI B=MASK
//             PRI NT   ENABLE=ONLI NE, RPTYPE=SELPCH
//MASK         DD    *
//             SELECT  DSN=<NAME>, VOL=<VOL>,
//                     GEN=<ABRGEN>, CYCLE=<ABRCYCLE>,
//                     NVOL=PAY*
```

The generated statements on SYSPUNCH will look like:

```
SELECT DSN=PAYROLL. HOURLY. MASTER, VOL=PAY001,
       GEN=0123, CYCLE=005,
       NVOL=PAY*
```

CONTINUED . . .

## 53.45 CONTINUED . . .

**GENERATE** FDREPORT is to generate an IDCAMS jobstream to delete selected clusters and data sets. The  
**IDCAMS** job will be submitted directly to the JES internal reader for execution. The punch mask is read from  
**DELETE** a member of the FDRLIB library.

```
//PUNCHMSK EXEC PGM=FDREPORT, REGI ON=OM
//SYSPRI NT DD SYSOUT=*
//SYSPUNCH DD SYSOUT=( A, I NTRDR)
//FDRLI B DD DSN=USER1. FDREPORT, DI SP=SHR
//SYSI N DD *
XSELECT XDSN=OLDFI LES. **
PUNCH MASKNAME=I DCDEL, ECHO
PRI NT DATATYPE=CATALOG, RPTYPE=SELPCH
```

Member IDCDEL of library USER1.FDREPORT contains:

```
) PREFI X
//DELETE JOB (ACCT), CLASS=M, MSGCLASS=X
//* DELETE OLD FI LES
//DELETE EXEC PGM=I DCAMS
//SYSPRI NT DD SYSOUT=*
) ENDPREFI X
DELETE <NAME> PURGE
```

The job submitted to the internal reader will look like:

```
//DELETE JOB (ACCT), CLASS=M, MSGCLASS=X
//* DELETE OLD FI LES
//DELETE EXEC PGM=I DCAMS
//SYSPRI NT DD SYSOUT=*
DELETE OLDFI LES. JCL. CNTL PURGE
DELETE OLDFI LES. RECORDS. KSDS PURGE
```

## 53.46 FDREPORT TAPE EXAMPLES

**Note:** the PRINT TVTOC function of program FDRABRP (See Section 53) can also be used to generate fixed-format reports from FDR-format backup tapes. PRINT TVTOC is available even to FDR customers who are not also ABR customers, while FDREPORT is only available if you have licensed ABR or FDREPORT.

**MAP BACKUP TAPE** FDREPORT is to read a FDR-format backup tape and report on the data sets included in that backup using the default report. The JCL shows an ABR full-volume backup, but it could be any backup created by FDR, DSF, ABR, or SAR.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//TAPE001     DD    DSN=FDABR. VPROD01. C1002300, DI SP=SHR
//SYSI N      DD    *
              TI TLE  LI NE=' DATA SETS ON BACKUP <TVTOCDSN>'
              PRI NT  DATATYPE=TVTOC
```

The generated report will look like:

**DATA SETS ON BACKUP FDRABR.VPROD01.C1002300**

DATA SET NAME	VOLSER	D/S ORG	RECFM	BLKSZ	LRECL	ALLOC	FREE	%FR
PAYROLL. TRANS	PROD01	PS	FB	3120	80	10	0	0
PROD. JCL. CNTL	PROD01	PO	FB	6160	80	5	2	40

**MAP BACKUP TAPES** FDREPORT is to read several FDR backup tapes and report on the PDS data sets included in those backups. The ENABLE=TAPERREAD option is included so that FDREPORT will read the entire backup to extract PDS directory information. The report is sorted by backup data set name and by size within backup.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT   DD    SYSOUT=*
//ABRMAP      DD    SYSOUT=*
//TAPE1       DD    DSN=PROD. BACKUP. VTS0001(O), DI SP=SHR
//TAPE2       DD    DSN=PROD. BACKUP. VTS0002(O), DI SP=SHR
//TAPE3       DD    DSN=PROD. BACKUP. VTS0003(O), DI SP=SHR
//SYSI N      DD    *
              TI TLE  LI NE=' PO DATA SETS ON BACKUP <TVTOCDSN>'
              SELE CT DSORG=PO
              SORT    FI ELD=( TVTOCDSN, SI ZE), SEQUENCE=(A, D),
                     BREAK=(YES, NO)
              REPO RT FI ELD=( SPLDSN, VOL, SI ZE, MEMBERS)
              PRI NT  DATATYPE=TVTOC, ENABLE=TAPERREAD, SORTALLOC=YES
```

The generated report will look like:

**PO DATA SETS ON BACKUP PROD.BACKUP.VTS0001.G0123V00**

DATA SET NAME	VOLSER	ALLOC	MEMBER
USER1. JCL. CNTL	TS0001	20	125

CONTINUED . . .



## 53.46 CONTINUED . . .

**PRINT** The ARCHIVE Control File contains only limited information about the original disk data sets  
**ARCHIVE** recorded in it. This jobstream will select a data set from the control file and submit a second job  
**INFO** which will read the ARCHIVE backup that contains it and report on selected fields.

```
//REPORT1      EXEC   PGM=FDREPORT, REGI ON=OM
//SYSPRI NT     DD     SYSOUT=*
//SYSPUNCH      DD     SYSOUT=(A, I NTRDR)      <== SUBMI T TO JES
//SYSI N        DD     *
                SELECT  DSN=datasetname          <== speci fy data set name here
                PUNCH   FDRLI B=MASK, ECHO
                PRI NT   DATATYPE=ARCHI VE, RPTYPE=SELPCH, COPY=1
//MASK          DD     DATA, DLM=$$
//j obname      JOB    requi red parameters
//REPORT2       EXEC   PGM=FDREPORT, REGI ON=OM
//SYSPRI NT     DD     SYSOUT=*
//TAPE1         DD     UNI T=<BKDEV TYP>, DI SP=SHR, LABEL=<BKFI LENO>,
//              VOL=SER=<BKVOL>, DSN=FDRABR. V<VOL>. <BSUFFI X>
//SYSI N        DD     *
                TI TLE   LI NE=' ARCHI VED DATA SET <NAME>'
                SELECT  DSN=<NAME>
                REPORT  FI ELD=( SPLNAME, VOL, DATES, SI ZEI NFO, EXTENTS)
                PRI NT   DATATYPE=TVTOC
```

## 53.47 FDREPORT YEAR 2000 EXAMPLES

These examples demonstrate the support in FDREPORT for 4-digit years, including the year 2000 and beyond.

**ARCHIVES  
EXPIRING  
BEYOND 1999**

FDREPORT is to report on archived data sets whose archive will expire in the next century. Note that the date on the XSELECT statement can contain a period for readability (2000.001) or the period can be omitted (2000001). The DATEFORMAT= operand affects only the format of the printed report. Dates on (X)SELECT statements can be entered with either 2- or 4-digit years (2-digit years are assumed to be 19xx).

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT    DD    SYSOUT=*
//ABRMAP       DD    SYSOUT=*
//SYSI N       DD    *
  TI TLE       LI NE=' ARCHI VED DATA SETS EXPI RI NG BEYOND 1999'
  DEFA ULT     DATEFORMAT=YYYYDDD
  XSELECT      BKEXDATE. GE. 2000. 001
  REPORT       FI ELD=( DSN, VOL, DSORG, SI ZE, BKDATE, BKEXDATE)
  PRI NT       DATATYPE=ARCHI VE
```

The generated report will look like:

**ARCHIVED DATA SETS EXPIRING BEYOND 1999**

DATA SET NAME	VOLSER	D/S ORG	ALLOC	BKDATE	BKEXDATE
USER1. FI LE1	TS0001	PS	22	1998. 056	2001. 056
USER2. JCL. CNTL	TS0023	PO	150	1997. 279	2000. 279

**IDENTIFY  
DATA SETS  
WITH  
PERMANENT  
RETENTION**

FDREPORT is report on all DASD data sets with expiration dates of 99365 or 99366 (both are considered permanent "never scratch" dates by MVS). Although current releases of MVS will bump any expiration calculated from a RETPD= value from 1999.365 to 2000.001, it is possible that a data set created under an earlier release of MVS might have a calculated date which is now incorrectly considered permanent. This report can be reviewed to ensure that all such data sets should really be considered permanent.

```
//REPORT      EXEC  PGM=FDREPORT, REGI ON=OM
//SYSPRI NT    DD    SYSOUT=*
//ABRMAP       DD    SYSOUT=*
//SYSI N       DD    *
  TI TLE       LI NE=' PERMANENT RETENTI ON DATA SETS'
  XSELECT      EXDATE=( 99365, 99366)
  REPORT       FI ELD=( SPLDSN, VOL, DATES)
  PRI NT       ENABLE=ONLI NE, DATEFORMAT=MMDDYYYY
```

The generated report will look like:

**PERMANENT RETENTION DATA SETS**

DATA SET NAME	VOLSER	CRDATE	LRDATE	EXDATE
USER1. JCL. CNTL	TS0001	05/07/1997	06/22/1997	12/31/1999



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**55.01 VTOC MAINTENANCE UTILITY OVERVIEW (FDRABRM)**

Automatic Backup & Recovery includes a utility program, FDRABRM, which provides the user with the ability to modify selected DSCBs in the VTOC of any disk volume that has been initialized for ABR processing. Easy to use commands make changing the ABR initialization criteria and requesting special ABR processing for selected data sets a relatively simple task.

**WHY A VTOC UTILITY**

As previously stated in this manual, ABR is activated by a FORMAT 1 DSCB within the VTOC of a disk volume. The VTOC maintenance utility created the ABR model DSCB and, optionally, marks data sets for special ABR processing during volume initialization ([See Section 90](#)). However, as the user becomes more experienced using ABR in his or her environment, it may be advantageous to modify a volume's initialization criteria to align the ABR functions with the volume usage. It may also be found that specific data sets or data set groups (i.e.: a data set group is one or more data sets having the same name prefix) should be brought under the control of ABR's special processing features.

**FDRABRM COMMANDS**

. . . ABRINIT command. Creates the ABR model DSCB and sets the initial processing values for the volume and its data sets.

**Note:** This command is documented in [Section 90](#).

. . . MAINT command. Changes the values in the ABR model DSCB.

. . . REMODEL command. Recreates the ABR model DSCB and resynchronizes the generation and cycle numbers.

. . . SELECT command. Used to indicate special ABR processing for the indicated data sets.

Note: Most of the functions of the ABRINIT, MAINT, and REMODEL commands may be conveniently executed using the ABR ISPF dialogs (option A.I.8)

**ABR SPECIAL PROCESSING**

The following ABR special processing features may be enabled/disabled by the VTOC maintenance utility:

. . . Always backup a data set, even if the updated indicator does not denote a potential change in the contents of the data set.

. . . Perform normal backup processing but never archive or scratch the data set, even if it has not been referenced for a prolonged period of time.

. . . Exclude the data set from all ABR processing except full volume backup. This does not preclude the use of specific control statements to cause the backup of the data set.

Note: A user can also exclude data set(s) from archive and backup by using the ABR protect lists.

. . . Mark a volume to prevent automatic archiving (TYPE=ARC).

. . . Mark a volume to permit the superscratch (TYPE=SCR) capability.

. . . Mark a volume to permit recording of previous cycles (OLDBACKUP).

. . . Change the default values stored in the ABR model DSCB for a volume (ex: GEN= RETPD=).

It is also possible to reset all ABR special processing indicators, reverting to normal ABR data set selection algorithms.

CONTINUED . . .

## 55.01 CONTINUED . . .

**MANUAL  
CONTROL  
OF ABR**

Although ABR is designed to be executed on a system that automatically indicates the last referenced date and update status of data sets, it is understood that users may elect to execute ABR in other environments.

Even in a manually-controlled environment, ABR can still perform data set selection based on the last referenced date and update indicator. A user can, therefore, select data sets or data set groups through ABR control statements ([See Section 50](#)) or mark the data sets directly with the VTOC maintenance utility.

The VTOC maintenance utility can, for selected data sets or data set groups:

- . . . Set the last referenced date.
- . . . Set all last referenced date values of zero (0) to today's date.
- . . . Turn the update indicator on or off.

**SMS CONSID-  
ERATIONS**

The ABRINIT and REMODEL commands supports the creation of ABR model DSCBs on volumes managed by SMS (System Managed Storage; [See Section 52.50](#)). The following rules and considerations apply:

- If any volume to be processed by ABR is SMS-managed, then the ABR catalog must be an ICF catalog ([Section 90.19](#)). The reason is that all data sets on an SMS-managed volume must be cataloged in an ICF catalog, including the ABR model DSCB.
- The SMS ACS routines will not determine the volume on which the ABR model DSCB is allocated. The volumes on which ABR model DSCBs are created will be selected based on the VOL, VOLG, and ONLINE operands and DISKxxxx DD statements. If a selected volume is SMS-managed, then a storage class must be assigned, or the creation will fail; a data class and/or a management class may optionally be assigned also. Details follow. If a selected volume is not SMS-managed, then any assigned SMS classes will be ignored.
- The ABR model DSCB on an SMS-managed volume must have a storage class assigned.
- The installation may set up its ACS routine to assign an appropriate storage class to ABR model DSCBs (data sets named FDRABR.Vxxxxxx with zero space). In this case, no special operands are needed on the ABRINIT or REMODEL command.
- If the ACS routine does not automatically assign a storage class, then a storage class must be assigned by the STORCLAS operand of the ABRINIT or REMODEL command.
- The installation's ACS routine may accept the requested storage class, or may change it to a different storage class. In these cases the ABR model DSCB will be successfully created.
- The installation's ACS routine may reject the requested storage class, i.e. may indicate that this data set should not be SMS-managed. In this case BYPASSACS must be specified on the ABRINIT or REMODEL command to allow the ABR model DSCB to be created.
- The ABR model DSCB on an SMS-managed volume may optionally have a data class assigned. The data class may be assigned only by the DATACLAS operand; the data class ACS routine is not given control. The data class has no effect on the processing of the ABR model DSCB; if specified, it is used only for documentation or reporting.
- The ABR model DSCB on an SMS-managed volume may optionally have a management class assigned. The management class may be assigned automatically by the ACS routine, or explicitly by the MGMTCLAS operand (unless overridden by the ACS routine). The specifications in the SMS definition for the management class will not be used by ABR for managing the ABR model DSCB; the ABR model DSCB will be backed up on every incremental backup, and will never be ARCHIVED. However, if other DASD management software that looks at the management class runs on this volume, the management class may be significant.

**55.02 VTOC UTILITY JCL REQUIREMENTS**

The following Job Control Statements are required to execute the ABR VTOC maintenance utility:

**JOB  
STATEMENT**

The JOB statement is user-specified and depends upon installation standards.

**EXEC  
STATEMENT**

Must specify the name of the ABR VTOC Maintenance Utility program, FDRABRM. It may also contain the region requirements of 256K.

**STEPLIB OR  
JOBLIB DD  
STATEMENT**

If required, must specify the load module library in which ABR resides. This library must be APF authorized.

**SYSPRINT DD  
STATEMENT**

Specifies the output message data set. This is a required DD statement and usually is a sysout data set or assigned to a TSO terminal.

**ABRMAP DD  
STATEMENT**

Specifies the VTOC/DSCB map data set. This is an optional DD statement if LIST is specified and usually is a sysout data set. If not present, the VTOC/DSCB map will be routed to SYSPRINT.

**SYSUDUMP DD  
STATEMENT**

Specifies the abend dump data set. Although not required, we strongly urge you to always include this DD statement so that we can help you diagnose your error conditions. Usually a sysout data set.

**DISKxxxx DD  
STATEMENT(s)**

Optional. When executing on an MVS, XA, or ESA system and specifying the ONLINE or VOL/VOLG operands, DISKxxxx DD statements are not required, since the desired volumes will be dynamically allocated with a ddname of DISKONL1.

If used, DISKxxxx DD statements specify the DASD volumes to be processed by commands that do not specify ONLINE or VOL/VOLG. The first four (4) bytes of the ddname must be 'DISK', and the remaining one (1) to four (4) bytes may be any characters valid in a ddname (0-9, A-Z, \$, #, @). The DD statement should be specified as follows:

```
//DISKxxxx DD UNI T=uni tname, VOL=SER=vvvvvv, DISP=SHR
```

**SYSIN DD  
STATEMENT**

Specifies the control statement data set. Usually an input stream or DD \* data set.

## 55.03 THE DEFAULT COMMAND

**DEFAULT**      *CSLREF,*  
                   *,CYCLE=nn,*  
                   *,GEN=nnnn*  
                   *,HIGHTHRESHOLD=nnn*  
                   *,LIST=ALL / YES / NO*  
                   *,LOWTHRESHOLD=nnn*  
                   *,RESERVE=NO / YES*  
                   *,RETPD=nnnn*

**DEFAULT  
COMMAND**

During VTOC maintenance, the DEFAULT command affects the printing of changed DSCBs, conditionally setting the last referenced date, if zero, and specifying whether reserve is used to protect the VTOC.

Multiple DEFAULT commands may be present within a control statement stream, with the most recently read being in effect at any given point in time.

**OPERANDS****CSLREF**

Specifies that the last referenced date, if zero, will be set to today's date.

**CYCLE=**

Specifies the number of cycles that are to be created in each generation of backups for this volume at installations that execute program FDRABR with DUMP commands that specify TYPE=AUTO. (For a full explanation of cycles and generations, [See Section 52](#)). The number specified must be between 0 and 63, inclusive.

The default value is 10 unless modified in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**GEN=**

Specifies the number of generations of backups for this volume that ABR is to maintain in the catalog. At the beginning of a new generation, program FDRABR will uncatalog all the backup tapes from the n'th prior generation, where n was the value specified for GEN=. (For a full explanation of generations, [See Section 52](#)). The number specified must be between 1 and 1000, inclusive.

The default value is 4 unless modified in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**HIGHTHRESHOLD=** Specifies the high allocation percentage threshold that ABR is to store in the ABR model DSCB. It may optionally be used to bypass ARCHIVE and SUPERSCRATCH on volumes which are below this threshold (For an explanation of threshold usage, [See Section 51](#)). The number specified must be between 0 and 100, inclusive.

The default value is 80 unless modified in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**LIST=**

LIST=YES will result in a VTOC list of data sets which have been referenced.

LIST=ALL will result in a complete VTOC list of this volume.

The default is NO.

CONTINUED . . .



## 55.03 CONTINUED . . .

**LOWTHRESHOLD=** Specifies the low allocation percentage threshold that ABR is to store in the ABR model DSCB. It may optionally be used to bypass ARCHIVE and SUPERSCRATCH on volumes which are below this threshold (For an explanation of threshold usage, [See Section 51](#)). The number specified must be between 0 and 100, inclusive.

The default value is 50 unless modified in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**RESERVE=** Specifies whether a reserve command is to be used to insure VTOC integrity during the update operations. If RESERVE=NO is specified, only an ENQ is issued.

The default is YES.

**RETPD=** Specifies the retention period, in days, for the full-volume backup tape that begins each new generation of backups for this volume. (All cycles within a generation will normally be set to expire on the same day as the full-volume backup. Retention periods can be overridden at execution time for program FDRABR. For a full explanation of cycles, generations, and retention periods for backups, [See Section 52](#)). The number specified for RETPD must be between 1 and 9999, inclusive.

The default value is 60 unless modified in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

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## 55.04 THE MAINT COMMAND

**MAINT** **VOL=v...v**  
**VOLG=v...v**  
**,CSLREF**  
**,CYCLE=nn**  
**,DISABLE= ( c...c ,...,c...c )**  
**,ENABLE= ( c...c ,...,c...c )**  
**,FORCE**  
**,GEN=nnnn**  
**,HIGHTHRESHOLD=nnn,**  
**,LIST=ALL | YES | NO**  
**,LOWTHRESHOLD=nnn**  
**,ONLINE**  
**,PRIORENTRIES=nn**  
**,PRIOROFFSET=nn**  
**,RESERVE=NO | YES**  
**,RESET= ( c...c ,...,c...c )**  
**,RETPD=nnnn**

**MAINT  
COMMAND**

The MAINT command serves to change the ABR criteria established during volume initialization. There are no defaults for the ABR criteria, only for the execution of the VTOC maintenance utility. MAINT commands must contain either the 'VOL=' or 'VOLG=' operand. MAINT commands without the 'VOL=' or 'VOLG=' operand will be marked as missing required operands and processing of the command will be bypassed.

The MAINT command also serves as a conversion aid, allowing the location of OLDBACKUP information within FORMAT 1 DSCBs to be moved from one location to another. Previously three locations within the DSCB were supported for OLDBACKUP information, but changes by IBM for DFSMS support now make only one location (DS1SYSCD, displacement 62) still usable. **Users who have volumes enabled for OLDBACKUP who have used any location other than DS1SYSCD for OLDBACKUP (or who have taken our default offset of 45) should convert to DS1SYSCD, especially if a DFSMS installation is planned.** For more information, see the PRIORENTRIES, PRIOROFFSET, and RESET=OLDBACKUP operands, as well as Example 5.

Note: If you change the volume serial number of a disk through any method other than a full-volume restore with ABR or FDR, you must run a MAINT command before taking any ABR backups. The MAINT command will adjust the data set name of the ABR model DSCB to reflect the new serial number of the disk. No operands except VOL or VOLG are required for this function.

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## 55.04 CONTINUED . . .

<b>ISPF DIALOG SUPPORT</b>	Most of the functions of the MAINT command can be performed by using the ISPF Panel FDR Installation – Set ABR Disk Volume Processing Options (Option A.I.8.)	
<b>OPERANDS</b>	<b>VOL=</b>	<p>Specifies the serial number of the ABR initialized disk volume whose ABR criteria are to be modified. A global volume serial number is available if the same maintenance is to be performed to multiple disk volumes. If VOL=&amp;ALLV (or the current value of the global volume serial number, if changed by the installation) is specified WITH THE ONLINE OPERAND, all disk volumes online to the system and initialized for ABR processing will be maintained. If VOL=&amp;ALLV is specified WITHOUT THE ONLINE OPERAND, all disk volumes referenced by 'DISKxxxx' DD statements and initialized for ABR processing will be maintained.</p> <p>Note: The global volume serial number is defined in the Global Option Table, FDROPT, maintained by FDRZAPOP.</p> <p>Either the VOL or VOLG operand must be present. The absence of the VOL or VOLG operands will result in the command being marked as missing a required operand and processing of the command will be bypassed.</p> <p>Note: Use of this operand conflicts with the VOLG operand.</p>
	<b>VOLG=</b>	<p>Specifies a group of serial numbers of ABR initialized disk volumes whose ABR criteria are to be modified.</p> <p>Either the VOLG or VOL operand must be present. The absence of the VOL or VOLG operands will result in the command being marked as missing a required operand and processing of the command will be bypassed.</p> <p>Note: Use of this operand conflicts with the VOL operand.</p>
	<b>CSLREF</b>	Specifies that the last referenced date of any data set on the volume or group, if zero, will be set to today's date.
	<b>CYCLE=</b>	<p>Specifies the number of cycles that are to be created in each generation of backups for this volume at installations that execute program FDRABR with dump commands that specify TYPE=AUTO. (For a full explanation of cycles and generations, <a href="#">See Section 52</a>). The number specified must be between 0 and 63, inclusive.</p> <p>The default is that the CYCLE value in the ABR Model DSCB will not be changed.</p>
	<b>DISABLE=</b>	Specifies the option(s) coded for this operand will be disabled for ABR processing. See the ENABLE operand for the available options.

CONTINUED . . .

## 55.04 CONTINUED . . .

- ENABLE=** Specifies the option(s) coded for this operand will be activated for ABR processing. The options are:
- ARCHIVE**—Sets the indicator on this volume to permit data set archiving. If the program FDRABR is executed against this volume with a dump command that specifies TYPE=ARC, the volume will be processed.
  - OLDBKUP**—Sets the indicator on this volume to permit recording of previous backup cycles (OLDBACKUP). If the program FDRABR is executed against this volume with a dump command that specifies TYPE=ABR, TYPE=DSF, TYPE=FDR or TYPE=AUTO, the previous backup cycles will be recorded. The location of the OLDBACKUP table within F1 DSCBs is specified in the FDR/ABR Global Option Table ([See Section 91 or 92](#)).
  - SCRATCH**—Sets the indicator on this volume to permit superscratch (TYPE=SCR). If the program FDRABR is executed against this volume with a dump command that specifies TYPE=SCR, the volume will be processed.
- The default, if neither DISABLE nor ENABLE is specified, is that those options in the ABR Model DSCB will not be changed.
- FORCE** Specifies that the maintenance is to be performed regardless of limiting cross checks.
- The default is any limiting cross checks (such as the PRIORENTRIES/PRIOROFFSET cross check made before moving OLDBACKUP information) will prevent maintenance from being performed.
- GEN=** Specifies the number of generations of backups for this volume that ABR is to maintain in the catalog. At the beginning of a new generation, program FDRABR will uncatalog all the backup tapes from the n'th prior generation, where n was the value specified for GEN=. (For a full explanation of generations, [See Section 52](#)). The number specified must be between 1 and 1000, inclusive.
- Note: If you set **GEN** to a lower value than it had previously, then on the next full-volume backup run, **FDRABR** may omit uncataloging some intervening generations. You should remove these generations with the **PURGE BACKUP** command ([Section 55.23](#)) of program **FDRABRCM**.
- The default is that the GEN value in the ABR model DSCB will not be changed.
- HIGHTHRESHOLD=** Specifies the high allocation percentage threshold that ABR is to store in the ABR model DSCB. It may optionally be used to bypass ARCHIVE and SUPERSCRATCH on volumes which are below this threshold (For an explanation of threshold usage, [See Section 51](#)). The number specified must be between 0 and 100, inclusive.
- The default is that the high threshold in the ABR model DSCB will not be changed.
- LIST=** LIST=YES will result in a VTOC list of data sets which have been referenced. LIST=ALL will result in a complete VTOC list of this volume.
- The default if LIST is not specified on a MAINT command is the value that was most recently specified for LIST on a DEFAULT command. If LIST has not been specified on a DEFAULT command, the default is no.

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## 55.04 CONTINUED . . .

**LOWTHRESHOLD=** Specifies the low allocation percentage threshold that ABR is to store in the ABR model DSCB. It may optionally be used to bypass ARCHIVE and SUPERSCRATCH on volumes which are below this threshold (For an explanation of threshold usage, [See Section 51](#)). The number specified must be between 0 and 100, inclusive.

The default is that the low threshold in the ABR model DSCB will not be changed.

**ONLINE** Specifies that the global volume serial number, if specified via the VOL operand, is to cause all online disk volumes not referenced by 'DISKxxxx' DD statements to be allocated for maintenance processing.

The default is that the global volume serial number will allow processing of all volumes referenced by 'DISKxxxx' DD statements.

**PRIORENTRIES=** Specifies the prior value used for OLDBENT, the number of OLDBACKUP entries to be recorded for each data set on each disk volume which is enabled for OLDBACKUP. Used in conjunction with the PRIOROFFSET and RESET=OLDBKUP operands to move the contents of the OLDBACKUP table from one location to another.

The limits vary depending on the value of PRIOROFFSET. The table shown after the PRIOROFFSET operand shows the minimum and maximum values possible for each PRIOROFFSET value. However, the value specified MUST be the OLDBOFF value that was previously set in the FDR option table.

There is no default. If PRIORENTRIES is specified without the PRIOROFFSET and RESET=OLDBKUP operands, the MAINT command will be marked as being in error and the command flushed.

**PRIOROFFSET=** Specifies the prior value used for OLDBOFF, the offset within the DSCB, relative to the start of the data set name(0), that ABR uses to record the OLDBACKUP entries for each data set on each disk volume which is enabled for OLDBACKUP. Used in conjunction with the PRIORENTRIES and RESET=OLDBKUP operands to move the contents of the OLDBACKUP table from one location to another.

ABR supports only three locations within a FORMAT 1 DSCB that may be used for OLDBACKUP recording. They are described in the following table as are the corresponding limits for the PRIORENTRIES operand. However, the value specified MUST be the OLDBOFF value that was previously set in the FDR option table.

Field Name	Offset Value		Entries Value	
	Low	High	Max	Min
DS1DSSN	45(2D)	49(31)	6(06)	2(02)
DS1SYSCD	62(3E)	73(49)	13(0D)	2(02)
RESERVED	78(4E)	80(50)	4(04)	2(02)

There is no default. If PRIOROFFSET is specified without the PRIORENTRIES and RESET=OLDBKUP operands, the MAINT command will be marked as being in error and the command flushed.

Note: The PRIORENTRIES and PRIOROFFSET values are checked against OLDBACKUP values stored in the ABR model DSCB during initialization.

If the check fails, the maintenance will not be performed unless FORCE is specified.

CAUTION: Before converting these fields, review the caution statement in [Section 55.07](#) – Example 5.

**RESERVE=** Specifies whether a reserve command is to be used to insure VTOC integrity during the update operations. If RESERVE=NO is specified, only an ENQ is issued.

The default is YES, unless specified on a preceding DEFAULT statement.

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## 55.04 CONTINUED . . .

**RESET=**

Specifies the option(s) coded for this operand that will be changed to conform with the current value or use. The options are:

**AUTOCYCL**— Sets the contents of the auto- cycle number to the current cycle number.

**OLDBKUP**— If OLDBKUP recording is enabled on this volume, reenables OLDBACKUP recording according to the current values of the OLDBENT and OLDBOFF options in the FDR option table. If used in conjunction with the PRIORENTRIES and PRIOROFFSET operands, will cause OLDBACKUP information to be moved from one location in the FORMAT 1 DSCB (specified by PRIOROFFSET/PRIORENTRIES) to another (specified by the current OLDBOFF/OLDBENT values). The current OLDBOFF/OLDBENT values in the FDR option table can be changed with FDRZAPOP ([See Section 91](#)) or the ABR ISPF dialogs ([See Section 92](#)).

**RETPD=**

Specifies the retention period, in days, for the full-volume backup tape that begins each new generation of backups for this volume. (All cycles within a generation will normally be set to expire on the same day as the full-volume backup. Retention periods can be overridden at execution time of program FDRABR. For a full explanation of cycles, generations, and retention periods for backups, [See Section 52](#)). The number specified for RETPD must be between 1 and 9999, inclusive.

The default is that the RETPD value in the ABR Model DSCB will not be changed.

## 55.05 THE REMODEL COMMAND

**REMODEL** *VOL=vvvvvv*  
*,AUTOCYCLE=nn*  
*,BYPASSACS*  
*,CYCLE=nn*  
*,DATACLAS=classname*  
*,DISABLE= ( c...c ,...,c...c )*  
*,ENABLE= ( c...c ,...,c...c )*  
*,EXPD=yyddd*  
*,FORCE*  
*,GEN=nnnn*  
*,HIGHTHRESHOLD=nnn*  
*,LASTGEN=nnnn*  
*,LASTCYCLE=nn*  
*,LIST=ALL | NO | YES*  
*,LOWTHRESHOLD=nnn*  
*,MGMTCLAS=classname*  
*,RETPD=nnnn*  
*,STORCLAS=classname*

**REMODEL COMMAND** The REMODEL command recreates the ABR model DSCB after it has been scratched or modified from a volume that was previously initialized for ABR.

REMODEL accepts all of the operands that ABRINIT accepts. REMODEL rebuilds the ABR model DSCB, but does not do anything to the other format 1 DSCBs in the VTOC. Therefore, special ABR processing options that were previously established with select commands are not disturbed. If the user wishes to change the processing options, he may include select commands in the run.

Note: If you do restore with SAR, the ABR backup information will be downleveled. the REMODEL command should be used to reset the ABR model DSCB to the current generation and cycle numbers indicated in the catalog. No operands except VOL and FORCE are required for this function.

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## 55.05 CONTINUED . . .

<b>OPERANDS</b>	<b>VOL=</b>	Specifies the serial number of the disk volume on which to recreate the ABR model DSCB. The VOL= operand is required.
	<b>BYPASSACS</b>	<p>On a system with SMS (System Managed Storage) active, specifies that the SMS ACS (Automatic Class Selection) routines are not to be invoked when allocating the ABR model DSCB. The SMS classes specified by the DATACLAS, MGMTCLAS, and STORCLAS operands will be assigned (if the volume on which the ABR model DSCB is being created is SMS-managed). BYPASSACS must be specified if the installation's ACS routines do not permit a storage class to be assigned to an ABR model DSCB on an SMS-managed volume. See "SMS Considerations" in <a href="#">Section 55.01</a>, and <a href="#">See Section 52.50</a>.</p> <p>Since BYPASSACS bypasses normal SMS allocation controls and rules, the user running the REMODEL job must be authorized to the RACF profile STGADMIN.ADR.RESTORE.BYPASSACS in class FACILITY, or the equivalent in other security systems.</p> <p>The default is that the SMS ACS routines will be invoked for the ABR model DSCB. The SMS classes, if any, specified by the MGMTCLAS and STORCLAS operands will be passed to the ACS routines, which may accept, change, or nullify them.</p>
	<b>AUTOCYCLE=</b>	<p>Specifies the most recent autocycle number for this volume. The number specified must be in the range of 0 to 63, inclusive.</p> <p>If not specified, ABR will search the ABR catalog for the most current cycle and set AUTOCYCLE to that value.</p>
	<b>CYCLE=</b>	<p>Specifies the number of cycles that are to be created in each generation of backups for this volume at installations that execute program FDRABR with dump commands that specify TYPE=AUTO. (For a full explanation of cycles and generations, <a href="#">See Section 52</a>.) The number specified must be between 0 and 63, inclusive.</p> <p>The default is 10 unless overridden by a preceding DEFAULT command or by a change in the FDR/ABR Global Option Table (<a href="#">See Sections 91 or 92</a>).</p>
	<b>DATACLAS=</b>	<p>Specifies the SMS data class to be associated with the ABR model DSCB if VOL= specifies a SMS-managed volume. The data class has no effect on the processing of the ABR model DSCB; if specified, it is used only for documentation or reporting.</p> <p>The default is that no data class will be associated with the ABR model DSCB.</p>
	<b>DISABLE=</b>	Specifies the option(s) coded for this operand will no longer affect ABR processing. See the ENABLE operand for the available options.
	<b>ENABLE=</b>	<p>Specifies the option(s) coded for this operand will be activated for ABR processing. The options are:</p> <p><b>ARCHIVE</b> – Sets the indicator on this volume to permit data set archiving. If the program FDRABR is executed against this volume with a dump command that specifies TYPE=ARC, the volume will be processed.</p> <p><b>OLDBKUP</b> – Sets the indicator on this volume to permit recording of previous backup cycles (OLDBACKUP). If the program FDRABR is executed against this volume with a dump command that specifies TYPE=ABR, TYPE=DSF, TYPE=FDR or TYPE=AUTO, the previous backup cycles will be recorded. The location of the OLDBACKUP table within F1 DSCBs is specified in the FDR/ABR Global Option Table (<a href="#">See Section 91 or 92</a>).</p> <p><b>SCRATCH</b> – Sets the indicator on this volume to permit superscratch (TYPE=SCR). If the program FDRABR is executed against this volume with a DUMP command that specifies TYPE=SCR, the volume will be processed.</p>

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- EXPD=** Specifies the expiration date of the latest full volume backup (TYPE=FDR). If not specified, ABR will add the retention period to today's date.
- FORCE** Specifies that ABR is to update the model DSCB if it currently exists on the disk volume. If not specified, ABR will not update an existing ABR model.
- GEN=** Specifies the number of generations of backups for this volume that ABR is to maintain in the catalog. At the beginning of a new generation, program FDRABR will uncatalog all the backup tapes from the n'th prior generation, where n was the value specified for GEN=. (For a full explanation of generations, [See Section 52](#)). The number specified must be between 1 and 1000, inclusive.
- Note: If you set **GEN** to a lower value than it had previously, then on the next full-volume backup run, **FDRABR** may omit uncataloging some intervening generations. You should remove these generations with the **PURGE BACKUP** command ([Section 55.23](#)) of program **FDRABRCM**.
- The default is 4 unless overridden by a preceding **DEFAULT** command or by a change in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).
- HIGHTHRESHOLD=** Specifies the high allocation percentage threshold that ABR is to store in the ABR model DSCB. It may optionally be used to bypass ARCHIVE and SUPERSCRATCH on volumes which are below this threshold (For an explanation of threshold usage, [See Section 51](#)). The number specified must be between 0 and 100, inclusive.
- The default is 80 unless overridden by a preceding **DEFAULT** command or by a change in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).
- LASTCYCLE=** Specifies the most recent cycle number for this volume. The number specified must be in the range of 0 to 63, inclusive.
- If not specified, ABR will search the ABR catalog for the most current GEN and CYCLE.
- Note: If **LASTCYCLE** is specified, **LASTGEN** must also be specified.
- LASTGEN=** Specifies the most current generation number for this volume. The number specified must be in the range of 1 to 9999, inclusive.
- If not specified, ABR will search the ABR catalog for the most current GEN and CYCLE.
- Note: If **LASTGEN** is specified, **LASTCYCLE** must also be specified.
- Warning: If **OLDBACKUP** is enabled on this volume, and **LASTGEN=** specifies a value less than the most recently created generation for the volume, then the **OLDBACKUP** information on the volume will become inaccurate.
- LIST=** Specifies whether the VTOC of the initialized disk volume is to be printed.
- The default, if **LIST** is not specified on a **REMODEL** command is the value that was most recently specified for **LIST** on a **DEFAULT** command. If **LIST** has not been specified on a **DEFAULT** command, the default is NO.

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- LOWTHRESHOLD=** Specifies the low allocation percentage threshold that ABR is to store in the ABR model DSCB. It may optionally be used to bypass ARCHIVE and SUPERSCRATCH on volumes which are below this threshold (For an explanation of threshold usage, [See Section 51](#)). The number specified must be between 0 and 100, inclusive.
- The default is 50 unless overridden by a preceding DEFAULT command or by a change in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).
- MGMTCLAS=** Specifies the SMS management class to be associated with the ABR model DSCB if VOL= specifies a SMS-managed volume. The ACS routine may accept, change, or nullify this class, unless BYPASSACS is specified. The specifications in the SMS definition for the management class will not be used by ABR for managing the ABR model DSCB; the ABR model DSCB will be backed up on every incremental backup, and will never be ARCHIVED. However, if other DASD management software that looks at the management class runs on this volume, the management class may be significant.
- The default is that no management class will be associated with the ABR model DSCBs, unless one is assigned by the ACS routine.
- RETPD=** Specifies the retention period, in days, for the full-volume backup tape that begins each new generation of backups for this volume. (All cycles within a generation will normally be set to expire on the same day as the full-volume backup. Retention periods can be overridden at execution time of program FDRABR. For a full explanation of cycles, generations, and retention periods for backups, [See Section 52](#)). The number specified for RETPD must be between 1 and 9999, inclusive.
- The default is 60 unless overridden by a preceding DEFAULT command or by a change in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).
- STORCLAS=** Specifies the SMS storage class to be associated with the ABR model DSCB if VOL= specifies a SMS-managed volume. The ACS routine may accept, change, or nullify this class, unless BYPASSACS is specified. However, if no storage class is assigned for an ABR model DSCB to be created on an SMS-managed volume, the creation will fail. See "SMS Considerations" in [Section 55.01](#).
- The default is that no storage class will be associated with the ABR model DSCBs which will cause the allocation of the ABR model to fail on a SMS-managed volume unless one is assigned by the ACS routine.

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**55.06 THE SELECT COMMAND -- FORMAT**

**SELECT** *DSN= ( dsname ,...,dsname) / DSG= ( dsgroup ,...,dsgroup)*  
*,ARCH=OFF / ON*  
*,CSLREF*  
*,LREF=TODAY / yyddd*  
*,OPTIONS=option*  
*,RESETABR*  
*,UPDT=OFF / ON*  
*,VOL=v...v, / VOLG=v...v*

**SELECT COMMAND** The SELECT command is used to indicate special ABR processing for data sets or data set groups. One or more select commands may be specified.

Note: Specification of either 'VOL=' or 'VOLG=' operand limits the data set(s) or data set group(s) to those found on the specific disk volume(s). If neither 'VOL=' nor 'VOLG=' operand is specified, all data sets that match the DSN/DSG specification(s) will be marked with the ABR criteria specified.

<b>OPERANDS</b>	<b>DSN=</b>	<p>Specifies string(s) from 1 to 44 characters in length. All data sets having a name that matches the selection criteria (i.e.: compare length is 44) are marked with the ABR options indicated.</p> <p>The default is deferred to DSG operand.</p>
	<b>DSG=</b>	<p>Specifies string(s) from 1 to 44 characters in length. All data sets having a name that matches the selection criteria (i.e.: compare length is the length of data specified) are marked with the ABR options indicated. There is a special form of the DSG operand. Leading periods (.) after DSG= indicate that the group name starts after one or more index levels. Each period indicates that one (1) index level is to be bypassed.</p> <p>Default is the SELECT command will be marked in error if neither DSN nor DSG is specified. A maximum of 40 DSN or DSG names may be specified per control card. DSN and DSG may be repeated and/or intermixed.</p>
	<b>ARCH=</b>	<p>Specifies that the archive indicator is to be turned ON or OFF.</p> <p>The default is the archive indicator remains unchanged.</p>

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<b>CSLREF</b>	Specifies that the last referenced date, if zero, will be set to today's date. This operand conflicts with LREF.
<b>LREF=</b>	Specifies the Julian date to be placed in the last referenced date field. LREF may be specified as today which will use the current Julian date or as yyddd. LREF will override CSLREF if CSLREF is specified on a REMODEL, MAINT, or DEFAULT command.  This operand conflicts with CSLREF.
<b>OPTIONS=</b>	Specifies the special ABR options that are in effect for all matching data sets. The available options are:  <b>AD</b> ...Always backup this data set on TYPE=ABR backups, but never archive it. <b>EX</b> ...Exclude from all ABR processing except full volume backup. <b>ND</b> ...Normal backup, never archive. <b>RD</b> ...Revert to normal ABR processing.  The default is that the special processing indicators remain unchanged.  Note: This option only affects existing data sets. A user can also exclude data set(s) from archive or backup by using the ABR protect lists.  VSAM Note: If an ICF VSAM cluster is to be marked, all of the VSAM components must be specified by name or group.
<b>RESETABR</b>	Specifies that the ABR indicators are to be reset.  Caution: RESETABR will remove any indication that the data set has been processed by ABR. It is designed to be used if a data set, that originated in a location where the ABR fields within the DSCB are non-zero, is restored by FDRABR or FDRDSF to an ABR initialized volume.  There is no default. If RESETABR is not specified, the ABR indicators are not modified.
<b>UPDT=</b>	Specifies that the update indicator is to be turned on or off.  The default is the update indicator remains unchanged.
<b>VOL=</b>	Specifies the serial number of the disk volume on which to search for the data set(s) or data set group(s).  If neither VOL= nor VOLG= is specified, and DSN= (not DSG=) was specified on this SELECT statement, ABR will attempt to locate the data set in the catalog. If found, VOL= the cataloged volume serial is assumed.
<b>VOLG=</b>	Specifies a group of serial numbers of disk volumes on which to search for the data set(s) or data set group(s).  The default is that, if neither VOLG= nor VOL= is specified, FDRABRM will search all of the volumes referenced by the DISKxxxx DD statements, plus any volumes dynamically allocated, for the data set(s) specified,  Under MVS, FDRABRM will dynamically allocate any required online volumes that are not referenced by DISKxxxx DD statements.  Note: VOL and VOLG are mutually exclusive.

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**55.07 VTOC UTILITY JCL EXAMPLES**

Note: Most of the functions of the ABRINIT, MAINT, and REMODEL commands may be conveniently executed using the ABR ISPF dialogs (option A.I.8)

**EXAMPLE 1** Change the ABR initialization criteria on disk volume PROD01, setting the tape retention period to 75 days and setting its low and high allocation thresholds to 60 and 90 percent. Change the ABR initialization criteria on disk volume PROD02, prohibiting automatic archiving. Mark all data sets beginning with 'SYS2.' on all disk volumes referenced by DISKxxxx DD statements as normal backup, never archive. Print changed DSCBs.

```
//MAI NT      EXEC   PGM=FDRABRM, REGI ON=256K
//SYSPRI NT   DD     SYSOUT=A
//SYSI N      DD     *
  DEFAULT     LI ST=YES
  MAI NT      VOL=PROD01, RETPD=75,
              LOWTHRESHOLD=60, HI GHTHRESHOLD=90
  MAI NT      VOL=PROD02, ARC=OFF
  SELECT      DSG=SYS2. , OPTI ONS=ND
/*
```

**EXAMPLE 2** Mark all 'user.' data sets on disk volumes referenced by DISKxxxx DD statements with a last referenced date of 90.300. In addition, mark all 'user.' data sets on disk volume MYVOL1 as having been updated. Do not print changed data sets.

```
//STEP1       EXEC   PGM=FDRABRM, REGI ON=256K
//SYSPRI NT   DD     SYSOUT=A
//DI SKABC    DD     UNI T=DI SK, VOL=SER=MYVOL1, DI SP=SHR
: : :
//DI SKN      DD     UNI T=DI SK, VOL=SER=vvvvvv, DI SP=SHR
//SYSI N      DD     *
  DEFAULT     LI ST=NO
  SELECT      DSG=USER. , LREF=90300
  SELECT      DSG=USER. , VOL=MYVOL1, UPDT=ON
/*
```

**EXAMPLE 3** User has accidentally scratched the ABR model DSCB. This job will reset the volume to the current GEN and CYCLE as stored in the ABR catalog. The default number of cycles for TYPE=AUTO is set to 6. The default retention period for the volume is set to 30 days, and the high allocation threshold is set to 95. The low threshold and the GEN= value will be set to the defaults in the ABR Global Option Table.

```
//REMODL      EXEC   PGM=FDRABRM
//SYSPRI NT   DD     SYSOUT=A
//SYSI N      DD     *
  REMODEL     VOL=TST001, CYCLE=6, RETPD=30, HI GHTHRESHOLD=95
/*
```

**EXAMPLE 4** User has accidentally changed the ABR model DSCB. This job will update the volume to the current GEN and CYCLE.

```
//REMODL      EXEC   PGM=FDRABRM
//SYSPRI NT   DD     SYSOUT=A
//SYSI N      DD     *
  REMODEL     VOL=SYS001, FORCE
/*
```

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**EXAMPLE 5** User needs to change the location within the FORMAT 1 DSCB used to record the OLDBACKUP entries. The old location is the DS1DSSN field at offset 45 (2D), with six (6) entries being recorded. The new location is to be the DS1SYSCD field at offset 62 (3E), and thirteen (13) entries are to be recorded. In addition to changing the OLDBACKUP location and number of entries, move the OLDBACKUP entries from the current location to the new location.

Since the old location in this example is DS1DSSN, it will be set to the volume serial after the move; otherwise, the old location would be set to binary zeroes. (Exception: if the old location is DS1DSSN, but a data set being processed is multi-volume and this is not the first volume, then DS1DSSN will be set to binary zeroes.)

A. Change the OLDBOFF and OLDBENT options. Either go to ISPF panel A.I.4.7 and set OLDBENT to 13 and OLDBOFF to 62, or run the following batch job:

```
//ZAPOP      EXEC   PGM=FDRZAPOP
//SYSLIB     DD     DI SP=SHR, DSN=abr. load. library
//SYSPRINT    DD     SYSOUT=*
//SYSIN      DD     *
ZAP          OLDBOFF=62, OLDBENT=13
```

B. As with any change to the FDR/ABR global options, it is necessary to follow the procedure in [Section 92.51](#), Step 8, to put the change into effect:

If running MVS/ESA, issue the operator command:

```
MODIFY LLA, REFRESH      or preferably
MODIFY LLA, UPDATE=xx .
```

C. Run FDRSTART.

D. If you have more than one system, do steps B (for MVS/ESA only) and C on every system.

E. Now we can run the job that actually changes the OLDBACKUP location on the disk packs.

```
//MOVEOB     EXEC   PGM=FDRABRM
//SYSPRINT    DD     SYSOUT=A
//SYSIN      DD     *
MAINT        VOL=&ALLV, ONLINE, RESET=OLDBKUP,
              PRIOROFFSET=45, PRIORENTRIES=6
```

Caution: Please take careful note of the following considerations when converting the OLDBACKUP offset:

- All volumes should be converted at the same time. If not, or in case of failure, the OLDBACKUP information will be compromised, the FDRABRP PRINT BACKUP report may give incorrect information, and data set restores may fail (for instance, in the case of restores from OLDBACKUP where the SCRATCH Catalog has incorrect information). The conversion should be done at a quiet time, since some OS components (such as OPEN and CLOSE) do not serialize the VTOC for update.
- Full volume backups should be taken after the conversion is completed. Data set restores from a generation before the conversion will restore the OLDBACKUP information as garbage, which may potentially be a source of errors and confusion.
- If the FDR Global Options Table exists in more than one load module library, the table should be updated in all libraries at the same time to reflect the same OLDBACKUP offset. This is advisable in case one of the other libraries is ever used. The conversion of the OLDBACKUP offset is compatible between versions of FDR, as long as the different versions have the same OLDBACKUP offset value in their FDR Global Options Table.
- If the conversion process is interrupted and some volumes are converted to the new offset but others are not, you may simply rerun the conversion, and only the volumes which were not yet converted will be converted.



## 55.10 ARCHIVE MAINTENANCE UTILITY OVERVIEW (FDRARCH)

AUTOMATIC BACKUP & RECOVERY includes a utility program, FDRARCH, which provides the capability of performing selected maintenance functions to the ARCHIVE control file.

### FDRARCH COMMANDS

...FORMAT command. Creates an ABR ARCHIVE control file.

**NOTE: This command is documented in [Section 90](#).**

...DUMP command. Creates a sequential backup copy of an ARCHIVE control file.

...RESTORE command. Restores the backup copy of an ARCHIVE control file.

...REORG command. Reorganizes an ARCHIVE control file.

...DELETE command. Mark archive records for deletion.

...RESET command. Remove deletion indicators.

...MERGE command. Merge multiple ARCHIVE control files into one.

...MODIFY command. Change fields within archive records in the ARCHIVE control file (e.g., expiration dates).

...RECATALOG command. Reset auto-recall indicators in system catalogs.

### SUPPORTED FUNCTIONS

With easy to use commands, the user can perform the following selected maintenance functions to an ARCHIVE control file:

...Create a backup copy of an ARCHIVE control file.

...Restore an ARCHIVE control file from a backup copy and, optionally, change its size, device type or blocking.

...Mark records within an ARCHIVE control file for deletion during the next reorganization.

...Remove the DELETION indicator from records within an ARCHIVE control file.

...Reorganize an ARCHIVE control file while creating a backup copy. Expired, deleted and restored entries can be removed during a reorganization. Unreferenced ARCHIVE tapes are optionally uncataloged.

...Merge multiple ARCHIVE control files into one control file.

...Change fields in data set entries in an ARCHIVE control file, such as expiration dates.

...Restore auto-recall indicators in the catalog entries of archived data sets.

### ARCHIVE FORMAT COMMAND

The ARCHIVE FORMAT command to initialize an ARCHIVE control file is documented in [Section 90.30](#).

### OPERAND DEFAULTS

The defaults for many operands on FDRARCH commands may be permanently changed from the defaults shown in the command descriptions which follow, by making changes in the ABR option table. Either the FDRZAPOP program or the ABR ISPF installation panel A.I.4.6 may be used.

# 55.11 ARCHIVE UTILITY JCL REQUIREMENTS

The following JOB control statements are required to execute the ARCHIVE maintenance utility.

## **JOB STATEMENT**

The JOB Statement is user-specified and depends upon installation standards.

## **EXEC STATEMENT**

Must specify the name of the ABR ARCHIVE Utility Program, FDRARCH. It may also contain the region requirements of 1024K.

## **STEPLIB OR JOBLIB DD STATEMENT**

If required, must specify the load module library in which ABR resides. This must be an authorized library.

## **SYSPRINT DD STATEMENT**

Specifies the output message data set. This is a required DD statement and usually is a SYSOUT data set.

## **SYSUDUMP DD STATEMENT**

Specifies the ABEND DUMP data set. Although not required, we strongly urge you to always include this DD statement so that we can help you diagnose your error conditions. Usually a SYSOUT data set.

Those who have the ABEND-AID product from COMPUWARE should also include the following DD statement to insure that a complete dump will be taken in case an error occurs:

```
//ABNLI GNR    DD    DUMMY
```

## **ARCHIVE DD STATEMENT**

Specifies the ARCHIVE control file. This data set must be allocated to a disk volume. NO DCB PARAMETERS MAY BE SPECIFIED. If creating a new ARCHIVE control file, a SPACE= parameter with secondary allocation and RLSE are supported and recommended. The data set name must contain an index level of "ARCHIVE" in other than the first level index unless NODSNCK operand is specified. This data set must be allocated on a disk volume that has been initialized by the ABR VTOC maintenance utility, FDRABRM, for ABR processing. For an existing ARCHIVE control file, DISP=SHR can be used; FDRARCH and FDRABR used ENQ/RESERVE macros to serialize access to the file.

If the ARCHIVE DD statement is not present and the user has either enabled 'DYNARC' in the ABR option table or specified 'DYNARC' on the current subcommand, the ARCHIVE control file will be dynamically allocated using the ARCDN data set name in the ABR option table.

## **TAPE1 DD STATEMENT**

Specifies the file to be used for the backup copy of the ARCHIVE control file. This DD statement is used to output the backup copy of the ARCHIVE control file if the DUMP or REORG commands are executed. It is used to input a backup copy of the ARCHIVE control file if the RESTORE command is executed.

NOTE: A TAPE DEVICE MUST BE USED UNLESS DUMPDEVICE=DISK HAS BEEN SPECIFIED.

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55.11 CONTINUED . . .

**ABRWORK DD  
STATEMENT**

This is an OPTIONAL DD statement used by the REORG subcommand if UNCAT=YES is specified or defaulted. If this DD statement is present and references a data set, the data set will contain a list of all the ARCHIVE dump data sets active at the time of the REORG, their use counts, and catalog status. In addition, the DCB characteristics will be set to:

DSORG=PS, RECFM=FB, LRECL=128, BLKSI ZE=4096

If this DD statement is not present, FDRARCH will dynamically allocate and use a temporary data set. Allocation of the data set will be to the device type specified by the WORKUNIT operand which defaults to SYSALLDA.

**TEMPARCH DD  
STATEMENT**

This is an OPTIONAL DD statement used by the REORG subcommand for a temporary updated copy of the ARCHIVE control file if both SORT=YES and SIMULATE are specified. Care should be taken if you choose to include this DD statement to allocate enough space to contain the results of the REORG simulation. If not enough space is allocated, the simulation will be terminated.

If this DD statement is not present, FDRARCH will dynamically allocate and use a temporary data set. Allocation of the data set will be to the device type specified by the WORKUNIT operand which defaults to SYSALLDA.

**SORT DD  
STATEMENTS**

If you are executing the REORG subcommand with SORT=YES or other operands requesting sorting (see SORT= under REORG). You may need to specify DD statements required by your system SORT product (e.g. SORTLIR, SORTWKnn).

However, they may not be required if you have requested dynamic allocation of the SORT files via the SORTALLOC= operand of REORG.

**SYSIN DD  
STATEMENT**

Specifies the control statement data set. Usually an input stream or DD \* data set.

## 55.12 THE DUMP COMMAND

**DUMP** *ARCDD=ddname*  
*,DUMPDEVICE=DISK / TAPE*  
*,DYNARC*  
*,NODSNCK*  
*,TODD=ddname*

**DUMP COMMAND** The DUMP command causes a formatted backup copy of the ARCHIVE control file to be created. This backup is not in FDR format, and can only be restored by the RESTORE command of FDRARCH. The ARCHIVE control file may be dumped by FDRABR in FDR format at the end of each dump TYPE=ARC operation.

<b>OPERANDS</b>	<b>ARCDD=</b>	Specifies the name of the DD statement to be used to reference THE ARCHIVE control file. The default is ARCHIVE.
	<b>DUMPDEVICE=</b>	Specifies the device type that is to be used as a DUMP medium. <b>DISK</b> — permits the DUMP data set to be placed on either disk or tape devices. <b>TAPE</b> —restricts the DUMP data set to tape devices only. The default is TAPE.
	<b>DYNARC</b>	Specifies the ARCHIVE control file is to be dynamically allocated using the value of ARCDSDN from the ABR option table if the ARCHIVE DD statement is not present. The default is the ARCHIVE control file is not dynamically allocated.
	<b>NODSNCK</b>	Specified that the name of the ARCHIVE control file is NOT to be validated. The default is that the name of the ARCHIVE control file must have an index level of "ARCHIVE" after the highest level index. The remaining characters are up to the discretion of the user.
	<b>TODD=</b>	Specifies the name of the DD statement to be used when creating the backup copy of the ARCHIVE control file. The default is TAPE1.

## 55.13 THE RESTORE COMMAND

**RESTORE** *ARCDD=ddname*  
*,B=n*  
*,DUMPDEVICE=DISK / TAPE*  
*,DYNARC*  
*,ERASE*  
*,FROMDD=ddname*  
*,NODSNCK*  
*,RECS=nnnnnnnn*

**RESTORE COMMAND** The RESTORE Command creates an ARCHIVE control file from a backup copy output from the dump command.

The DUMP and RESTORE commands of FDRARCH can be used to move the ARCHIVE control file to a different device type or to change its size or blocking factor. The RESTORE command of FDRARCH cannot be used to restore the backup of the ARCHIVE control file that is created by FDRABR at the end of every ARCHIVE run; that backup can only be restored by FDRABR or FDRDSF.

If the data set to which FDRARCH is restoring is a new allocation, it does not have to be pre-initialized with the FORMAT command ([Section 90](#)) because the RESTORE command includes the functions of FORMAT.

<b>OPERANDS</b>	<b>ARCDD=</b>	<p>Specifies the name of the DD statement to be used to reference the ARCHIVE control file.</p> <p>The default is ARCHIVE.</p>
	<b>B=</b>	<p>Specifies the number of blocks to be placed on each track. May be a number from</p> <p>1 through 5 inclusive. ABR will automatically calculate the best blocksize for this device to fit this number of blocks per track.</p> <p>The default value is 2.</p> <p>NOTE: On a 3380, 3390 or 9340 disk drive, full track blocking will default to half track.</p>

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## 55.13 CONTINUED . . .

<b>DUMPDEVICE=</b>	<p>Specifies the device type that is eligible to be used as a RESTORE medium.</p> <p><b>DISK</b> — accepts RESTORE data from either tape or disk devices.</p> <p><b>TAPE</b> — restricts the RESTORE data to tape devices only.</p> <p>The default is TAPE.</p>
<b>DYNARC</b>	<p>Specifies the ARCHIVE control file is to be dynamically allocated using the value of ARCDN from the ABR option table if the ARCHIVE DD statement is not present.</p> <p>The default is the ARCHIVE control file is not dynamically allocated.</p>
<b>ERASE</b>	<p>Specifies the user gives permission to restore over a previously formatted ARCHIVE control file.</p> <p>The default does not permit writing over a formatted ARCHIVE control file.</p>
<b>FROMDD=</b>	<p>Specifies the name of the DD statement to use when reading the backup copy of the ARCHIVE control file.</p> <p>The default is TAPE1.</p>
<b>NODSNCK</b>	<p>Specifies the name of the ARCHIVE control file is not to be validated.</p> <p>The default is that the name of the ARCHIVE control file must have an index level of "ARCHIVE" after the highest level index. The remaining characters are up to the discretion of the user.</p>
<b>RECS=</b>	<p>Specifies, in conjunction with the SPACE parameter on the ARCHIVE DD statement, the number of data set entries that will be formatted on the ARCHIVE control file. May be a number between 1 and 1,000,000 (1 million) inclusive.</p> <p>The default is the number of records that were used on the dumped ARCHIVE control file or 2000, whichever is larger.</p> <p>Sufficient space must be allocated to the ARCHIVE control file to contain the specified (or defaulted) number of data set entries. This space may include secondary allocations.</p> <p>If the SPACE parameter specifies the RLSE operand, then FDRARCH will format as many blocks as are necessary to contain the specified (or defaulted) number of data set entries. The operating system will release any excess space.</p> <p>If the SPACE parameter does not specify the RLSE operand, then FDRARCH will format at least the entire primary space allocation.</p>

## 55.14 THE REORG COMMAND

**REORG** *ARCDD=ddname*  
*,CATERROR=IGNORE | PURGE | RETAIN*  
*,DELETE=IGNORE | PURGE | RETAIN*  
*,DISABLE=TMS*  
*,DUMPDEVICE=DISK | TAPE*  
*,DYNARC*  
*,ENABLE=BYPASSCATERR | EXPANDREASON | IFNOTAUTOREC | IFNOTCAT | PRINTALIAS*  
*| PRINTALL | PRINTMASK | PRINTSELECT | PRINTSTATUS | TMS*  
*,EXPIRE=IGNORE | PURGE | RETAIN*  
*,MAXGENERATIONS=nnn*  
*,MAXOCCURRENCES=nnn*  
*,MSG=NO | YES*  
*,NODSNCK*  
*,NOLOG*  
*,RECALL=YES | NO*  
*,RESTORE=IGNORE | PURGE | RETAIN*  
*,SIMULATE*  
*,SORT=YES | NO*  
*,SORTALLOC=NO | SORTLIB | SORTMSG | SORTOUT | SORTWORK | YES*  
*,SORTCORE=nnnnnnnn*  
*,SORTLIB=dsname*  
*,SORTMSG=AC | AP | CC | NO | PC*  
*,SORTMSGDDNAME=ddname*  
*,SORTPFX=cccc*  
*,TODD=ddname*  
*,UNCAT=NO | YES*  
*,WORKDDNAMES=n*  
*,WORKUNIT=cccccccc*

NOTE: THE REORG COMMAND SHOULD BE SET UP TO RUN AS A WEEKLY JOB.

SIGNIFICANT PERFORMANCE ENHANCEMENTS HAVE BEEN MADE WITH FDRARCH V5.2 WHEN REORGANIZING THE ABR ARCHIVE CONTROL FILE.

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## 55.14 CONTINUED . . .

**REORG  
COMMAND**

The REORG command, after creating a formatted backup copy of the ARCHIVE control file, removes from the ARCHIVE control file any entries that are no longer required. The space occupied by the removed records is recovered. All ARCHIVE backups no longer referenced within the ARCHIVE control file may optionally be deleted and uncataloged. Any data sets within the ARCHIVE control file that are marked for auto recall may also be optionally uncataloged if they are removed.

Note that reorganization of a large ARCHIVE control file containing over 100,000 data sets (or clusters) that have been ARCHIVED for auto recall can take an excessive amount of time using versions of FDRARCH prior to version 5.2. This is because of the high overhead in catalog locate (SVC 26) processing used to determine if a data set (or cluster) is currently recallable. A SORT-based reorganization service is now available which will eliminate much of the catalog overhead.

The following operands have been added to support the SORT-based service ONLY:

MAXGENERATIONS, MAXOCCURRENCES, SORT,  
SORTALLOC, SORTCORE, SORTLIB, SORTMSG,  
SORTMSGDDNAME, SORTPFX, and WORKDDNAMES

The following options have been added to the ENABLE operand to support the SORT-based service ONLY:

BYPASSCATERR, IFNOTAUTOREC, IFNOTCAT, PRINTALIAS,  
PRINTALL, PRINTMASK, PRINTSELECT, and PRINTSTATUS

**CAUTION:** Specifying ANY of the operands and/or ENABLE options that are directed toward the SORT-based reorganizations service ONLY will cause SORT=YES to be set UNLESS SORT=NO IS ALSO SPECIFIED.

**OPERANDS ARCD=**

Specifies the name of the DD statement that is to be used to reference the ARCHIVE control file.

The default is ARCHIVE.

**CATERROR=**

Specifies the processing required if an error is encountered while issuing a LOCATE SVC or reading an ICF catalog.

**IGNORE** — The error is to be ignored and treated like a “not--found” condition (I.E.: data set is not cataloged) unless the result would be creation of a catalog entry. If a catalog entry would be created, the entry is retained in the ARCHIVE control file in its current state for processing after the error within the catalog has been corrected.

**PURGE** — The error is to cause the entry to be purged from the ARCHIVE control file, if that is an available option. If not, it is treated like CATERROR=IGNORE.

**RETAIN** — Do not continue to process the entry. Retain it for processing after the error within the catalog has been corrected.

The default is RETAIN.

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## 55.14 CONTINUED . . .

**DELETE=**

Specifies the processing required for any deleted entries (entries marked by the DELETE command for removal from the ARCHIVE control file) that are encountered.

**IGNORE** — The DELETE indicator does not participate in selection criteria.

**PURGE** — Drop the entry from the ARCHIVE control file unless prevented by other selection criteria (i.e.: EXPIRE=RETAIN).

**RETAIN** — Retain the entry even if other selection criteria calls for its removal.

The default, if none of the controlling operands (DELETE, EXPIRE, RESTORE) are specified, is DELETE=PURGE. If other controlling operands are specified, the default is DELETE=IGNORE.

**DISABLE=TMS**

Specifies that if UNCAT=YES is specified or defaulted, then REORG is to uncatalog any ARCHIVE backup tape files that are no longer required (See UNCAT=).

The default is that if the TMS (tape management) option is set in the FDR/ABR Global Option Table ([See Sections 91 and 92](#)), UNCAT=YES will only uncatalog tape files that appear to be under tape management catalog control (EXPDT=99000).

**DUMPDEVICE=**

Specifies the device type that is eligible to be used as a DUMP/RESTORE medium.

**DISK** — Permits the DUMP/RESTORE data set to be placed on either disk or tape devices.

**TAPE** — Restricts the DUMP/RESTORE data set to tape devices only.

The default is TAPE.

**DYNARC**

Specifies the ARCHIVE control file is to be dynamically allocated using the value of ARCDN from the ABR option table if the ARCHIVE DD statement is not present.

The default is the ARCHIVE control file is not dynamically allocated.

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## 55.14 CONTINUED . . .

**ENABLE=**

Specifies that the option(s) coded shall be activated for this reorganization.  
**BYPASSCATERR** — Do not report catalog processing errors detected by FDRARCH.

**EXPANDREASON** — Print expanded drop reasons during ARCHIVE reorganize.

**IFNOTAUTOREC** — Delete any entry that is not marked for auto recall. Entries that are not marked for auto recall will not be deleted unless this option is enabled.

**IFNOTCAT** — Delete any entry that has been ARCHIVED for auto recall but is not currently cataloged for auto recall. Entries that are not currently cataloged for auto recall will not be deleted unless this option is enabled.

**PRINTALIAS** — Print all ALIAS catalog entries processed by FDRARCH.

**PRINTALL** — Print all catalog entries processed by FDRARCH.

**PRINTMASK** — Print the mask entries created for use by FDRARCH.

**PRINTSELECT** — Print all catalog entries selected for processing by FDRARCH.

**PRINTSTATUS** — Print the status messages created by FDRARCH.

**TMS** — Indicates that an automated tape management system, such as CA1, CA-TLMS, EPIC, or DFSMSRMM is in use in the system. Enabling this option means FDRARCH will only uncatalog and/or recatalog an ARCHIVE backup file if it's expiration date is 99000.

The default for the TMS option is taken from the FDR/ABR Global Option Table ([See Sections 91 and 92](#)).

Multiple values may be specified for this operand if entered as (c. . .c, . . ., c. . .c).

EXAMPLE: REORG ENABLE=(TMS,IFNOTCAT) specifies only ARCHIVE backup files with an expiration date of 99000 be uncataloged and entries not cataloged for auto recall be dropped.

**EXPIRE=**

Specifies the processing required for any expired entries (entries whose ARCHIVE backup data set expiration date has been exceeded, for both copies if both are present) that are encountered.

**IGNORE** — The EXPIRED indicator does not participate in selection criteria.

**PURGE** — Drop the entry from the ARCHIVE control file unless prevented by other selection criteria (i.e.: DELETE=RETAIN).

**RETAIN** — Retain the entry even if other selection criteria calls for its removal.

The default, if none of the controlling operands (DELETE, EXPIRE, RESTORE) are specified, is EXPIRE=PURGE. If other controlling operands are specified, the default is EXPIRE=IGNORE.

**MAXGENERATIONS=**

Specifies the maximum number of ARCHIVED copies of any given generation data group that will reside in the ARCHIVE control file at the end of the reorganization. The number may be any number from 1 to 32000, inclusive.

The default is the maximum number of generations is not part of the processing criteria.

**MAXOCCURRENCES=**

Specifies the maximum number of ARCHIVED copies of any given data set that will reside in the ARCHIVE control file at the end of the reorganization. The number may be any number from 1 to 32000, inclusive.

The default is the maximum number of ARCHIVED copies of any given data set is not part of the processing criteria.

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## 55.14 CONTINUED . . .

<b>MSG=</b>	<p>Specifies whether the catalog processing messages are to be printed.</p> <p><b>NO</b> — Do not print catalog processing messages.</p> <p><b>YES</b> — print catalog processing messages.</p> <p>The default is YES.</p>
<b>NODSNCK</b>	<p>Specifies the name of the ARCHIVE control file is not to be validated. A valid ARCHIVE control file name must have an index level that starts with "ARCHIVE", other than the first index level.</p> <p>The default is the name of the ARCHIVE control file is validated.</p>
<b>NOLOG</b>	<p>Specifies that the messages detailing the entries dropped from the ARCHIVE control file are not to be printed.</p> <p>The default is the messages are to be printed.</p>
<b>RECALL=</b>	<p>Specifies the processing requirements for those ARCHIVE control file records marked for auto recall.</p> <p><b>NO</b> — Ignore the auto recall indicator.</p> <p><b>YES</b> — Test for the auto recall indicator.</p> <p>If so indicated and the record is to be dropped during reorganization, uncatalog the special data set catalog entry.</p> <p>The default is YES.</p>
<b>RESTORE=</b>	<p>Specifies the processing required for any restored entries (entries that are marked as having been successfully restored by FDRABR) that are encountered.</p> <p><b>IGNORE</b> — The restored indicator does not participate in selection criteria.</p> <p><b>PURGE</b> — Drop the entry from the ARCHIVE control file unless prevented by other selection criteria (i.e.: DELETE=RETAIN).</p> <p><b>RETAIN</b> — Retain the entry even if other selection criteria calls for its removal.</p> <p>The default is RESTORE=IGNORE.</p>
<b>SIMULATE</b>	<p>Specifies that the reorganization of the ARCHIVE control file is only to be simulated. No entries are uncataloged. The ARCHIVE control file is not rewritten.</p> <p>The default is to actually reorganize the ARCHIVE control file.</p>
<b>SORT=</b>	<p>Specifies if the SORT-based version of the REORG command is to be used.</p> <p><b>NO</b> — the SORT-based version of the REORG command is NOT to be used.</p> <p><b>YES</b> — the SORT-based version of the REORG command is to be used.</p> <p>The default is NO unless one or more operands are specified that are only valid only when SORT=YES is specified. It is assumed that SORT=YES is IMPLIED by specification of these operands and the default is changed to YES. The following operands will IMPLY SORT=YES:</p> <p>MAXGENERATIONS, MAXOCCURRENCES, SORTALLOC, SORTCORE, SORTLIB, SORTMSG, SORTMSGDDNAME, SORTPFX, and WORKDDNAMES</p>

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- SORTALLOC=** Specifies if FDRARCH is to dynamically allocate sort related DD statements and, if allocation is requested, which ddnames are to be allocated.
- NO** — do not dynamically allocate SORT related ddnames.
- SORTLIB** — dynamically allocate the SORTLIB ddname using the value in the operand SORTLIB for the dsname.
- SORTMSG** — dynamically allocate the SORT message output ddname using the value in the operand SORTMSGDDNAME for the ddname.
- SORTOUT** — dynamically allocate the SORTOUT ddname using the value in the operand WORKUNIT as the unitname.
- SORTWORK** — dynamically allocate the number of SORTWKnn ddnames specified in the operand WORKDDNAMES, using the value in the operand WORKUNIT as the unitname.
- YES** — dynamically allocate all SORT related ddnames.
- Multiple values may be specified for this operand if entered as (C. . .C, . . .,C. . .C).
- EXAMPLE: REORG SORTALLOC=(SORTWORK,SORTOUT) specifies the SORT work and output DD statements are to be dynamically allocated to temporary data sets.
- The default is NO.
- SORTCORE=** Specifies the amount of storage the program SORT is to use if external sorting is required. The number may be from 10000 to 8000000 inclusive.
- The default is taken from the FDR/ABR Global Option Table and is usually 100000. [See Sections 91](#) and [92](#) to change.
- SORTLIB=** Specifies the dataset name to be allocated to the DDNAME SORTLIB.
- The default is 'SYS1.SORTLIB'.
- SORTMSG=** Specifies the message option to be used by the program SORT if external sorting is required.
- AC**—all messages to the console
- AP**—all messages to the printer(sysout)
- CC**—critical messages to the console
- CP**—critical messages to the printer
- NO**—no messages to be produced
- PC**—critical messages to both console and printer
- The default is taken from the FDR/ABR Global Option Table and is usually CC.
- [See Sections 91](#) and [92](#) to change.
- SORTMSGDDNAME=** Specifies the DDNAME to be used by the the program SORT if messages are to be output to the printer.
- The default is SYSOUT.

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<b>SORTPFX=</b>	<p>Specifies the DDNAME prefix to be used by the program SORT if external sorting is required. If the string specified is less than 4 characters, a dollar sign(\$) fill character will be used.</p> <p>The default is taken from the FDR/ABR Global Option Table and is usually "SORT". <a href="#">See Sections 91</a> and <a href="#">92</a> to change.</p>
<b>TODD=</b>	<p>Specifies the DDNAME to be used when creating a backup copy of the ARCHIVE control file.</p> <p>The default is TAPE1.</p>
<b>UNCAT=</b>	<p>Specifies whether ARCHIVE disk or tape backup files which are no longer referenced in the ARCHIVE control file due to this REORG (all data sets which were ARCHIVED into those files have been PURGED) are to be scratched and/or uncataloged. If the TMS option is set in the FDR/ABR Global Option Table (<a href="#">See Sections 91 or 92</a>), tapes will be uncataloged only if they have an expiration date of 99.000 (tape management catalog control) unless the DISABLE=TMS option was specified on the REORG statement.</p> <p><b>NO</b> — Do not uncatalog ARCHIVE backup files that are no longer referenced.</p> <p><b>YES</b> — Uncatalog ARCHIVE backup files that are no longer referenced.</p> <p>The default is YES.</p>
<b>WORKDDNAMES=</b>	<p>Specifies the number of SORT work ddnames to allocate. The number may be from 1 to 5, inclusive.</p> <p>The default is 3.</p>
<b>WORKUNIT=</b>	<p>Specifies the unit name, a value from 1 to 8 characters in length, that represents one or more groups of like DASD devices, to use when allocating any of the temporary work files.</p> <p>The default is SYSALLDA.</p>

## 55.15 THE DELETE COMMAND

**DELETE** *ADATE=yyddd*  
*,ARCDD=ddname*  
*,CATERROR=IGNORE / PURGE / RETAIN*  
*,DSN=(dsname,...,dsname)*  
*,DSG=(dsgroup,...,dsgroup)*  
*,DYNARC*  
*,FRDATE=yyddd*  
*,IFNOTCAT*  
*,NODSNCK*  
*,TAPEFILE=nnnn*  
*,TAPEVOL=vvvvvv*  
*,TODATE=yyddd*  
*,VOL=vvvvvv*

**DELETE COMMAND** The DELETE Command is used to mark records within the ARCHIVE control file for deletion during the next reorganization. The command may appear more than once in the control statement stream, with the limitation of forty (40) data set names or groups for any given DELETE control statement. FDRARCH will scan the ARCHIVE control file and mark for deletion all records that match the selection criteria.

NOTE: One or more of the following selection criteria **MUST** be specified: ADATE, DSN, DSG, FRDATE, IFNOTCAT, TAPEVOL, TODATE, VOL.

<b>OPERANDS</b>	<b>ADATE=</b>	<p>Specifies the date of the ARCHIVE run of the records to be marked for deletion. Only records created with this archive date will be marked for deletion.</p> <p>The default is the date of the ARCHIVE does not participate in the selection criteria. All selection is then based on DSN/DSG and/or VOL.</p>
	<b>ARCDD=</b>	<p>Specifies the name of the DD statement to be used to reference the ARCHIVE control file.</p> <p>The default is ARCHIVE.</p>
	<b>CATERROR=</b>	<p>Specifies the processing required if an error is encountered while issuing a LOCATE SVC or reading an ICF catalog.</p> <p><b>IGNORE</b> — The error is to be ignored and treated like a “not--found” condition (i.e., data set is not cataloged) unless the result would be creation of a catalog entry. If a catalog entry would be created, the entry is retained in the ARCHIVE control file in its current state for processing after the error within the catalog has been corrected.</p> <p><b>PURGE</b> — The error is to cause the entry to be purged from the ARCHIVE control file, if that is an available option. If not, it is treated like CATERROR=IGNORE.</p> <p><b>RETAIN</b> — Do not continue to process the entry. Retain it for processing after the error within the catalog has been corrected.</p> <p>The default is RETAIN.</p>

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<b>DSN=</b>	Specifies string(s) from 1 TO 44 characters in length. Only records whose data set name exactly matches will be marked for deletion.
<b>DSG=</b>	Specifies string(s) from 1 TO 44 characters in length. Only records whose data set name begins with the specified string will be marked for deletion.  DSN= and DSG= may be repeated and intermixed on the same DELETE statement.  The default, if neither the DSN= or DSG= operands are specified, is that the data set name will not be used as a deletion criterion.
<b>DYNARC</b>	Specifies the ARCHIVE control file is to be dynamically allocated using the value of ARCDSN from the ABR option table if the ARCHIVE DD statement is not present.  The default is the ARCHIVE control file is not dynamically allocated.
<b>FRDATE=</b>	Specifies the FROM range of dates of the ARCHIVE run. ABR will test that the data set(s) to be selected were archived on this date or higher.  The default is that the date does not participate in the selection criteria.
<b>IFNOTCAT</b>	Specifies that entries which were archived with the auto recall option are to be marked for removal from the ARCHIVE control file if they are no longer cataloged or if the catalog no longer indicates they are eligible for auto recall processing.  The default is the catalog status of the entries is not checked.  Note: IFNOTCAT is a high overhead option under the DELETE command. It is recommended that the new SORT based REORG command with ENABLE=IFNOTCAT be used as a performance option.
<b>NODSNCK</b>	Specifies that the name of the ARCHIVE control file is NOT to be validated.  The default is that the name of the ARCHIVE control file must have an index level of "ARCHIVE" after the highest level index. The remaining characters are up to the discretion of the user.
<b>TAPEFILE=</b>	Specifies a file sequence number of the archive tape data set that contains the entry that is to be marked for removal. Ignored unless TAPEVOL= is also specified.  The default is that the file sequence number does not participate in the selection criteria.
<b>TAPEVOL=</b>	Specifies a volume serial number of the archive tape data set that contains the entry that is to be marked for removal. The volume serial number will be matched against both the copy 1 and copy 2 volume serial number lists.  The default is that the tape volume serial number does not participate in the selection criteria.
<b>TODATE=</b>	Specifies the to range of dates of the archive run. ABR will test that the data set(s) to be selected were archived on this date or before.  Default is that the date does not participate in the selection criteria.
<b>VOL=</b>	Specifies the volume serial number of the disk that the archive records were created from. Only those records having a matching originating volume serial number will be selected.  Default is no originating volume serial number checking is made. All selection is then based on DSN/DSG and/or ADATE.

**55.16 THE RESET COMMAND**

**RESET**    *ADATE=yyddd*  
               *,ARCDD=ddname*  
               *,DSN=(dsname,...,dsname)*  
               *,DSG=(dsgroup,...,dsgroup)*  
               *,DYNARC*  
               *,FRDATE=yyddd*  
               *,NODSNCK*  
               *,TAPEFILE=nnnn*  
               *,TAPEVOL=vvvvvvv*  
               *,TODATE=yyddd*  
               *,VOL=vvvvvvv*

**RESET COMMAND**    The RESET command is used to reset the deletion indicator within records in the ARCHIVE control file. Those records which were marked for deletion by the DELETE command can be thus salvaged. The command can appear more than once in the control statement stream, with the limitation of forty (40) data set names or groups for any RESET control statement. FDRARCH will scan the ARCHIVE control file and reset the deletion indicator of any record that matches the selection criteria.

**OPERANDS**    The operands of the RESET command are identical to those of the DELETE command, with the exception of the IFNOTCAT operand, and are documented in [Section 55.15](#).



## 55.17 THE MERGE COMMAND

**MERGE** *MERGEDDNames=(ddname,ddname,...)*  
*,ARCDD=ddname*  
*,ERASE*  
*,B=n*  
*,NODSNCK*  
*,CATERROR=IGNORE / PURGE / RETAIN*  
*RECATALOG=YES / NO*  
*,DYNARC*  
*,RECS=nnnnnnnn*

**MERGE  
COMMANDS**

The MERGE command merges one (1) or more ARCHIVE control files into a single new ARCHIVE control file. Up to sixteen (16) ARCHIVE control files may be merged in a single execution of the MERGE command. All records regardless of their status (DELETED, EXPIRED, RESTORED, etc.) will be copied, making the MERGE command useful in combining the ARCHIVE control file of subsidiaries or acquisitions during data center consolidation, provided the high level qualifier used (i.e., FDRABR) is the same. If records must be removed prior to merging the files, use the DELETE and REORG commands before merging the files.

Remember, ONLY ARCHIVE CONTROL FILES THAT USE THE SAME HIGH LEVEL QUALIFIER FOR THE GENERATION OF THE NAME OF THE BACKUP DATA SET CAN BE MERGED TOGETHER.

**OPERANDS**

**MERGEDDNames=** Specifies the DDNAME(S) to be used when merging ARCHIVE control files into a single ARCHIVE control file. Up to sixteen (16) DDNames may be specified for a single command if entered as follows:

MERGEDDNames=(c...c,...,c...c)

The MERGEDDNames= operand is required.

**ARCDD=**

Specifies the name of the DD statement that is to be used to reference the output ARCHIVE control file.

The default is ARCHIVE.

**B=**

Specifies the blocking factor to be used to create (or restore) the ARCHIVE control file. The number may be from 1 to 5, inclusive. FDRARCH will automatically calculate the best block size for the device to fit this number of blocks per track.

The default is 2.

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## 55.17 CONTINUED . . .

<b>CATERROR=</b>	<p>Specifies the processing required if an error is encountered while issuing a LOCATE svc or reading an ICF catalog.</p> <p><b>IGNORE</b> — The error is to be ignored and treated like a “not--found” condition (i.e., data set is not cataloged) unless the result would be creation of a catalog entry. If a catalog entry would be created, the entry is retained in the ARCHIVE control file in its current state for processing after the error within the catalog has been corrected.</p> <p><b>PURGE</b> — The error is to cause the entry to be purged from the ARCHIVE control file, if that is an available option. If not, it will be treated like CATERROR=IGNORE.</p> <p><b>RETAIN</b> — Do not continue to process the entry. Retain it for processing after the error within the catalog has been corrected.</p> <p>The default is RETAIN.</p>
<b>DYNARC</b>	<p>Specifies the ARCHIVE control file is to be dynamically allocated using the value of ARCDN from the ABR option table if the ARCHIVE DD statement is not present.</p> <p>The default is the ARCHIVE control file is not dynamically allocated.</p>
<b>ERASE</b>	<p>Specifies that overlaying an existing ARCHIVE control file is permitted.</p> <p>The default is that overlaying an existing ARCHIVE control file is prohibited.</p>
<b>NODSNCK</b>	<p>Specifies the name of the ARCHIVE control file is not to be validated. A valid ARCHIVE control file name must have an index level that starts with ‘ARCHIVE’, other than the first index level.</p> <p>The default is the name of the ARCHIVE control file is validated.</p>
<b>RECATALOG=</b>	<p><b>YES</b> — Specifies that for any entries in any input ARCHIVE control file which are flagged for AUTO-RECALL, MERGE will update the pointers in the catalog entries for those data sets to point to the proper location in the merged control file.</p> <p><b>NO</b> — specifies that auto-recall catalog entries are not to be corrected.</p> <p>NO should be used when the merged control file is not to replace the input control files for auto-recall processing.</p> <p>The default is YES.</p>
<b>RECS=</b>	<p>Specifies, in conjunction with the space parameter on the DD statement that allocates an ARCHIVE control file, the number of data set name entries that will be formatted on the ARCHIVE control file. The number may be from 1 and 1,000,000 (1 million), inclusive.</p> <p>The default is the number of records that are to be merged from all ARCHIVE control files.</p> <p>Sufficient space must be allocated to the ARCHIVE control file to contain the specified (or defaulted) number of data set entries. The space may include secondary allocations.</p> <p>If the space parameter specifies the RLSE operand, the FDRARCH will format as many blocks as are necessary to contain the specified (or defaulted) number of data set entries. The space may include secondary allocations.</p> <p>If the space parameter does not specify the RLSE operand, FDRARCH will format at least the entire primary space allocation.</p>

## 55.18 THE MODIFY COMMAND

**MODIFY** *ARCDD=ddname**,DYNARC**,NODSNCK**,REAL* | *,SIMULATE*

The following operands control selection of the ARCHIVE control file entries to be modified; one or more of them **MUST** be specified.

*,ADATE=yyddd*, | *FRDATE=yyddd*, *TODATE=yyddd**,DSN=(dsname,...,dsname)**,DSG=(dsgrout,...,dsgrout)**,EXPDATE=yyddd* | *,FREXPDATE=yyddd*, *TOEXPDATE=yyddd**,TAPEVOL=(vvvvvv,...)* | *,TAPEFILE=nnnn**,VOL=vvvvvv*

The following operands specify the modifications to be made to the selected ARCHIVE control file entries. One or more of them should be specified.

*,NEWDEV=devtype**,NEWEXDATE=yyddd**,NEWEXPIRE=ADATE* / *EXPIRE* / *TODAY* | *,DAYS-=nnnn* / *,DAYS+=nnnn**,NEWTAPEVOL=(vvvvvv,...)* | *,NEWTAPEFILE=nnnn**,RESET=(option,option,...)**,SET=(option,option,...)**,TAPECOPY=1* / *2* / *BOTH*

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**MODIFY  
COMMAND**

The MODIFY command is used to make changes to data set entries within the ARCHIVE control file. Entries to be modified may be selected by data set name (or group), by the date of archive, by expiration date of the archive copy, by disk volume serial, by archive backup volume serial (and file number if tape), or a combination of these. In those selected entries, the expiration date and/or the archive backup volume serials, file number, and device type may be modified.

The MODIFY command is commonly used to extend the expiration of archived data sets, by changing the expiration date recorded in the ARCHIVE control file.

NOTE: It is the user's responsibility to make any required changes in the expiration dates recorded by a tape management system.

MODIFY may also be used to change the volume serial(s), file number, and device type of an ARCHIVE backup. This may be used after an FDRTSEL or FDRTCOPY run ([See Section 10.10](#)) if it failed to update the ARCHIVE control file, to avoid having to recopy the tape.

WARNING: MODIFY should always be run in SIMULATION mode (without the "REAL" operand) first to be sure that the expected changes will be made. We also recommend that a backup of the ARCHIVE control file be taken first so that changes can be easily backed out. Please contact INNOVATION if you have questions on the use of the MODIFY command.

**OPERANDS**

**ADATE=**  
**FRDATE=**  
**TODATE=**

Specifies that entries are to be selected from the ARCHIVE control file based on the date that they were archived. Either a specific date (ADATE=yyddd) or a range of dates (FRDATE=yyddd, TODATE=yyddd) may be given.

The default is that the date of archive will not be used as a selection criterion.

**ARCDD=**

Specifies the name of the DD statement that is to be used to reference the output ARCHIVE control file.

The default is ARCHIVE.

**DSN=**

Specifies string(s) from 1 TO 44 characters in length. Only records whose data set name exactly matches will be selected.

NOTE: Data set filtering ([Section 52.16](#)) is not supported at this time.

**DSG=**

Specifies string(s) from 1 TO 44 characters in length. Only records whose data set name begins with the specified string will be selected.

DSN= and DSG= may be repeated and intermixed on the same MODIFY statement.

The default, if neither the DSN= or DSG= operands are specified, is that the data set name will not be used as a selection criterion.

**DYNARC**

Specifies the ARCHIVE control file is to be dynamically allocated using the value of ARCDSDN from the ABR option table if the ARCHIVE DD statement is not present.

The default is the ARCHIVE control file is not dynamically allocated.

**EXPDATE=**  
**FREXPDATE=**  
**TOEXPDATE=**

Specifies that entries are to be selected from the ARCHIVE control file based on expiration date of the archive backup (the expirations of both COPY1 and COPY2, if both exist, will be checked). Either a specific date (EXPDATE=yyddd) or a range of dates (FREXPDATE=yyddd, TOEXPDATE=yyddd) may be given.

The default is that the expiration date will not be used as a selection criterion.

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<b>NEWDEV=</b>	<p>Specifies that the selected entries are to be modified to indicate a new device type for the archive backup file. NEWDEV= will be ignored unless NEWTAPEVOL= is also specified. Valid values are:</p> <p>Disk: 3380, 3390, 9340</p> <p>Tape: 3400-5 (1600 BPI), 3400-6 (6250 BPI), TAPE (6250 BPI), 3480, 3480X(IDRC), 3490</p>
<b>NEWEXDATE=</b> <b>NEWEXPIRE=</b> <b>DAYS-=</b> <b>DAYS+=</b>	<p>Specifies that the selected entries are to be modified with a new expiration date for the archive backup files. The new date can be explicitly specified (NEWEXDATE=yyddd) or it can be calculated (NEWEXPIRE= and either DAYS-= or DAYS+=). NEWEXPIRE specifies the base date for the calculation and can have values:</p> <p><b>ADATE</b> — the date that the selected data set was originally archived.</p> <p><b>EXPIRE</b> — the current expiration date of the data set.</p> <p><b>TODAY</b> — the current date.</p> <p>DAYS-= or DAYS+= should be specified with NEWEXPIRE= and specify the number of days to be subtracted from or added to the base date to arrive at the new expiration.</p>
<b>NEWTAPEVOL=</b> <b>NEWTAPEFILE=</b>	<p>Specifies that the selected entries are to have the volume serial(s) (and optionally the tape file number) of the archive backup file modified. NEWTAPEVOL= will be ignored if TAPEVOL= was not also specified. If the number of volume serials specified (up to 5) is not the same as the number of serials specified by TAPEVOL=, or if NEWTAPEFILE= is specified, then TAPEFILE= must be specified to clearly define which records are to be updated.</p>
<b>NODSNCK</b>	<p>Specifies the name of the ARCHIVE control file is not to be validated. A valid ARCHIVE control file name must have an index level that starts with 'ARCHIVE', other than the first index level.</p> <p>The default is the name of the ARCHIVE control file is validated.</p>
<b>REAL</b>	<p>Specifies that the modifications are actually to be made to the ARCHIVE control file. SIMULATE is the opposite option.</p> <p>The default is SIMULATE. It is recommended that any MODIFY be run first in simulation mode.</p>
<b>RESET=</b>	<p>Specifies one or more special indicators to be turned off in the selected ARCHIVE Control file entries:</p> <p><b>AUTOREC</b> — turns off the indicator that the data set is eligible for AUTO-RECALL.</p> <p><b>DELETE</b> — turns off the indicator that the data set is flagged for deletion (can also be done by the RESET command).</p> <p><b>RESTORED</b> — turns off the indicator that the data has been restored by ABR.</p>
<b>SET=</b>	<p>Specifies one or more special indicators to be turned on in the selected ARCHIVE Control file entries. It has the same 3 options as RESET, but turns the indicators on instead of off.</p> <p>NOTE: Use this option if you forgot to specify RECALL when archiving and you now want the data set eligible for auto recall. Upon completion of the MODIFY, run the RECAT command.</p>
<b>SIMULATE</b>	<p>Specifies that the modification of the entries in the ARCHIVE control file is only to be simulated. No entries are changed. The ARCHIVE control file is not rewritten. REAL is the opposite option.</p> <p>The default is SIMULATE. It is recommended that any MODIFY be run first in simulation mode.</p>

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## 55.18 CONTINUED . . .

**TAPECOPY=**

Specifies which archive backup copy is to be modified in records selected. Values are:

**1** — Only COPY1 information will be updated.

**2** — Only COPY2 information will be updated.

**BOTH** — Both copies (if both exist) will be updated.

For expiration date changes (NEWEXDATE and NEWEXPIRE), the default is BOTH. Even if the record was selected because EXPDATE or FREXPDATE/TOEXPDATE matched only one (1) copy, BOTH copies will be changes UNLESS TAPECOPY is specified.

For ARCHIVE backup changes (NEWDEV, NEWTAPEVOL, and NEWTAPEFILE), the default is that the change will be made in which ever copy matches on TAPEVOL and, if specified, TAPEFILE. If TAPECOPY is specified for ARCHIVE backup changes, then only the specified copy will be changed if and only if TAPEVOL/TAPEFILE matches on that copy.

**TAPEVOL=  
TAPEFILE=**

Specifies that entries are to be selected from the ARCHIVE control file based on the volume serial(s) and optionally the file number (if tape) of the archive backup file. The backup file may be on tape or disk. TAPEFILE= may be specified only if TAPEVOL= is given. Both COPY1 and COPY2 (if both exist) will be checked. Up to 5 volume serials may be specified; the list of volume serials must exactly match the volser list recorded for a data set to be selected.

The default is that the archive backup is not used as a selection criterion.

**VOL=**

Specifies that entries are to be selected from the ARCHIVE control file based on the volume serial of the original disk volume from which they were archived.

The default is that the disk volume is not used as a selection criterion.

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## 55.18A THE RECATALOG COMMAND

**RECATALOG** *ADATE=yyddd*  
*,ARCDD=ddname,DYNARC*  
*,CATERROR=IGNORE / PURGE / RETAIN*  
*,CATVOL=CONSTANT / DEFAULT / ORIGINAL*  
*,DSN=(dsname,...,dsname)*  
*,DSG=(dsgroup,...,dsgroup)*  
*,DYNARC*  
*,NODSNCK*  
*,SERVICE=CONVERT / CORRECT / CREATE / MERGE / UNCATLG*  
*,VOL=volser*

**RECATALOG COMMAND** Successful operation of ABR AUTO-RECALL via the ABR LOCATE exit requires that archived data sets remain cataloged with a special indicator in a catalog field called DSCBTTR to indicate that they are archived for auto-recall; this field also serves as a pointer to the data set's record in the ARCHIVE control file to avoid lengthy searches. The DSCBTTR field may become corrupted or inaccurate, or the data set may be uncataloged, either making auto-recall via the locate exit impossible. A common cause of this is the IDCAMS function REPRO MERGECAT, which is used to move an ICF catalog, or merge or split catalogs; MERGECAT will zero the DSCBTTR field.

The RECATALOG command will attempt to create accurate catalog entries for data sets whose ARCHIVE control file entry indicates that they were archived with the RECALL option for auto-recall. RECATALOG will verify that the selected data set is currently not allocated on disk and will then create a new catalog entry if it does not exist, or update the existing entry if the DSCBTTR is zero. It will also correct inaccurate pointers into the ARCHIVE control file.

RECATALOG may also be used to uncatalog auto-recall entries, and to convert auto-recall catalog entries to the volser of MIGRAT (the ABR MIGRAT option) or back to their original volser.

WARNING: Because of the large number of catalog and VTOC accesses required, this may be an expensive command to run.

The RECATALOG command WILL NOT create generation data group catalog entries.

<b>OPERANDS</b>	<b>ADATE=</b> Specifies the date of the archive run of the records to be processed. <b>ARCDD=</b> Specifies the name of the DD statement that is to be used to reference the output ARCHIVE control file. The default is ARCHIVE. <b>CATERROR=</b> Specifies the processing required if an error is encountered while issuing a LOCATE svc or reading an ICF catalog. <b>IGNORE</b> — The error is to be ignored and treated like a “not--found” condition (i.e., data set is not cataloged) unless the result would be creation of a catalog entry. If a catalog entry would be created, the entry is retained in the ARCHIVE control file in its current state for processing after the error within the catalog has been corrected. <b>PURGE</b> — The error is to cause the entry to be purged from the ARCHIVE control file, if that is an available option. If not, it is treated like CATERROR=IGNORE. <b>RETAIN</b> — Do not continue to process the entry. Retain it for processing after the error within the catalog has been corrected. The default is RETAIN.
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## 55.18A CONTINUED . . .

<b>CATVOL=</b>	<p>Specifies the volume serial to be used when updating or creating the AUTO-RECALL catalog entry:</p> <p><b>CONSTANT</b> — specifies that a constant value (“MIGRAT”) is to be used.</p> <p><b>ORIGINAL</b> — specifies that the original volser that the data set was ARCHIVED from will be used.</p> <p>The default (DEFAULT) is that CONSTANT will be used if the MIGRAT option in the FDR/ABR Global Option Table is set to YES, otherwise ORIGINAL will be used.</p>
<b>DSN=</b>	<p>Specifies string(s) from 1 TO 44 characters in length. Only records whose data set name exactly matches will be selected.</p> <p>NOTE: Data set filtering (<a href="#">Section 52.16</a>) is not supported at this time.</p>
<b>DSG=</b>	<p>Specifies string(s) from 1 TO 44 characters in length. Only records whose data set name begins with the specified string will be selected.</p> <p>DSN= and DSG= may be repeated and intermixed on the same RECATALOG statement.</p> <p>The default, if neither the DSN= or DSG= operands are specified, is that the data set name will not be used as a selection criterion.</p>
<b>DYNARC</b>	<p>Specifies the ARCHIVE control file is to be dynamically allocated using the value of ARCDSN from the ABR option table if the ARCHIVE DD statement is not present.</p> <p>The default is the ARCHIVE control file is not dynamically allocated.</p>
<b>NODSNCK</b>	<p>Specifies the name of the ARCHIVE control file is not to be validated. A valid ARCHIVE control file name must have an index level that starts with “ARCHIVE”, other than the first index level.</p> <p>The default is the name of the ARCHIVE control file is validated.</p>
<b>SERVICE=</b>	<p>Specifies the services that the RECATALOG command is to perform for the selected data sets:</p> <p><b>CONVERT</b> — recatalog them for auto-recall, changing the volume serial in the catalog as indicated by CATVOL=, if necessary. CONVERT can be used to change auto-recall entries to and from use of the ABR MIGRAT option.</p> <p><b>CORRECT</b> — recatalog them for auto-recall with the correct TTR pointer.</p> <p><b>CREATE</b> — create an auto-recall catalog entry for them if not already cataloged.</p> <p><b>MERGE</b> — recatalog them for auto-recall with the correct TTR pointer if it is incorrect because of a MERGE of multiple ARCHIVE Control Files.</p> <p><b>UNCATLG</b> — uncatalog them.</p> <p>All these services verify that the data set is not really on disk before modifying the catalog entry. More than one service can be selected by enclosing them in parenthesis (except UNCATLG which must be used alone).</p> <p>The default is (CORRECT,CREATE,MERGE).</p>
<b>VOL=</b>	<p>Specifies that entries are to be selected from the ARCHIVE control file based on the volume serial of the original disk volume from which they were archived.</p> <p>The default is that the disk volume is not used as a selection criteria.</p>



# 55.19 ARCHIVE UTILITY JCL EXAMPLES

**EXAMPLE 1** Create a backup copy of an ARCHIVE control file named FDRABR.ARCHIVE.CONTROL.

```
//STEP1      EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//ARCHI VE    DD     DSN=FDRABR. ARCHI VE. CONTROL, DI SP=SHR
//TAPE1       DD     DSN=COPY. FDRABR. ARCHI VE,
//            UNI T=TAPE, DI SP=( , CATLG)
//SYSI N      DD     *
            DUMP
/*
```

**EXAMPLE 2** Create an ARCHIVE control file named 'TEST.ARCHIVE.CONTROL' by restoring a backup copy from a previously issued DUMP command. Allow space for 50000 records. Release unused space. The original ARCHIVE control file may have been on either the same device type or a different device type.

RECOMMENDATION: INNOVATION recommends using FDRARCH rather than FDRDSF or FDRABR to move the ARCHIVE Control File to a different device type. FDRARCH will automatically reblock for optimum usage.

```
//STEP1      EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//ARCHI VE    DD     DSN=TEST. ARCHI VE. CONTROL,
//            DI SP=( , CATLG) , UNI T=DI SK,
//            SPACE=( TRK, ( 500, 50) , RLSE)
//TAPE1       DD     DSN=PRI OR. BACKUP. ARCHI VE, DI SP=OLD
//SYSI N      DD     *
            RESTORE RECS=50000
/*
```

**EXAMPLE 3** Reorganize a test ARCHIVE control file named 'TEST.USER.CONTROL', removing expired records. The backup copy is to be named 'BACKUP.TEST.ARCHIVE'. Use a DDNAME of 'SAM' to reference the ARCHIVE control file and a DDNAME of 'TOM' to reference the backup copy.

```
//STEP1      EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SAM         DD     DSN=TEST. USER. CONTROL, DI SP=SHR
//TOM         DD     DSN=BACKUP. TEST. ARCHI VE,
//            UNI T=TAPE, DI SP=( , CATLG)
//SYSI N      DD     *
            REORG ARCDD=SAM, TODD=TOM, NODSNCK
/*
```

**EXAMPLE 4** Delete all ARCHIVE records created on 89.135 for disk volume MYPACK. Also reset the delete indicator for the DSN group SAVEDSN. Result will be that all records except those for DSG=SAVEDSN will be deleted during the next reorganization.

```
//STEP1      EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//ARCHI VE    DD     DSN=FDRABR. ARCHI VE, DI SP=SHR
//SYSI N      DD     *
            DELETE      ADATE=89135, VOL=MYPACK
            RESET      ADATE=89135, VOL=MYPACK, DSG=SAVEDSN.
/*
```

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55.19 CONTINUED . . .

**EXAMPLE 5** Merge three ARCHIVE control files into one control file. These files are indicated by the DDNAMES ARCHM1, ARCHM2 and ARCHM3. The new archive file is created using the DD name ARCHIVE.

```
//MERGE      EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//ARCHI VE    DD     DSN=FDRABR. ARCHI VE. NEW,
//           DI SP=( , CATLG) , UNI T=DI SK,
//           SPACE=(CYL, ( 100, 10) , RLSE)
//ARCHM1      DD     DSN=FDRABR. ARCHI VE. OLD1, DI SP=OLD
//ARCHM2      DD     DSN=FDRABR. ARCHI VE. OLD2, DI SP=OLD
//ARCHM3      DD     DSN=FDRABR. ARCHI VE. OLD3, DI SP=OLD
//SYSI N      DD     *
MERGE        MERGEDDNames=( ARCHM1, ARCHM2, ARCHM3)
/*
```

**EXAMPLE 6** User wishes to expand an existing ARCHIVE control file. The operation is in two steps. First a dump is taken to tape followed by a restore to a new ARCHIVE control file. The new ARCHIVE file can then be renamed back to the original name if necessary.

```
//EXPAND      EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//ARCHI VE    DD     DSN=FDRABR. ARCHI VE, DI SP=SHR
//TAPE1       DD     DSN=ARCHI VE. BACKUP, DI SP=( , PASS) ,
//           UNI T=TAPE
//SYSI N      DD     *
DUMP
/*
//RESTORE     EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//ARCHI VE    DD     DSN=FDRABR. NEW. ARCHI VE, DI SP=( , CATLG) ,
//           VOL=SER=XYZVOL, SPACE=(CYL, 15) , UNI T=DI SK
//TAPE1       DD     DSN=ARCHI VE. BACKUP, DI SP=(OLD, KEEP)
//SYSI N      DD     *
RESTORE
/*
```

- NOTE:**
1. The same ARCHIVE control file can be used on the restore by specifying secondary allocation on the ARCHIVE DD statement and ERASE on the RESTORE control statement.
  2. An ARCHIVE control file of 60 cylinders on a 3390 will be able to hold 150,000 non-VSAM data set sets and 40,000 VSAM clusters.

**EXAMPLE 7** Reorganize an ARCHIVE control file named in the ABR option TABLE FIELD 'ARCDNS'. The backup copy is to be named 'BACKUP.TEST.ARCHIVE' and allocated to disk.

```
//STEP1       EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//BACKUP      DD     DSN=BACKUP. TEST. ARCHI VE,
//           UNI T=DI SK, DI SP=( , CATLG)
//SYSI N      DD     *
REORG        DYNARC, DUMPDEVI CE=DI SK, TODD=BACKUP
/*
```

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55.19 CONTINUED . . .

**EXAMPLE 8** Extend by 30 days the expiration dates of all data sets which were archived between 88.001 and 89.001. Also set the expiration date of all data sets on tape volume ARC003 to 14 days from today. A tape management system utility may need to be executed to make the equivalent changes to tape management expiration dates.

```
//STEP1      EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
MODI FY      DYNARC, FREXPDATE=88001, TOEXpdate=89001,
NEWEXPI RE=EXPI RE, DAYS+=30
MODI FY      DYNARC, TAPEVOL=ARC003,
NEWEXPI RE=TODAY, DAYS+=14
/*
```

**EXAMPLE 9** Because of an IDCAMS REPRO MERGECAT the auto-recall indicators in the catalog for all data sets beginning with ABC. or XYZ. have been zeroed. Reset all of those indicators.

```
//STEP1      EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//SYSI N      DD     *
RECATALOG    DYNARC, DSG=(ABC. , XYZ. )
/*
```

**EXAMPLE 10** Reorganize a production ARCHIVE Control File named 'FDRABR.ARCHIVE', using the SORT-based reorganization technique. Remove only the expired and deleted records (which is the default). Allow FDRARCH to allocate all SORT required DD statements.

**RECOMMENDATION:** Strongly recommend that all existing FDRARCH REORG jobs be changed to use the new Sort based reorganization technique.

```
//STEP1      EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//ARCHI VE    DD     DI SP=SHR, DSN=FDRABR. ARCHI VE
//TAPE1       DD     DI SP=( , CATLG, CATLG) , DSN=dump. name,
//            UNI T=tape
//SYSI N      DD     *
REORG SORT=YES, SORTALLOC=YES
/*
```

**NOTE:** To run this job in simulation change the REORG statement as follows:

```
REORG      SORT=YES, SORTALLOC=YES, SI MULATE
```

CONTINUED . . .

55.19 CONTINUED . . .

**EXAMPLE 11** Simulate the reorganization of a production ARCHIVE Control File named 'FDRABR.ARCHIVE'. Remove all expired and deleted records, eliminate all but the most current ARCHIVED copy of any given data set, keep the six (6) most current ARCHIVED copies of any given generation data group, and drop all data set records that are no longer cataloged for auto recall. Use the 'TEMPARCH' DD statement to provide a copy of the reorganized file to better assess the impact of the options selected. Allow FDRARCH to allocate all SORT required DD statements.

NOTE: To insure there will be ENOUGH SPACE in the data set referenced by the DD statement 'TEMPARCH', allocate the data set with the SAME AMOUNT OF SPACE as the ARCHIVE Control File being processed.

```
//STEP1      EXEC   PGM=FDRARCH
//SYSPRI NT   DD     SYSOUT=*
//SYSUDUMP    DD     SYSOUT=*
//ARCHI VE    DD     DI SP=SHR, DSN=FDRABR. ARCHI VE
//TEMPARCH    DD     DI SP=( , CATLG, DELETE) , DSN=user . name,
//              UNI T=SYSALLDA, SPACE=( . . . )
//SYSI N      DD     *
  REORG       SI M, SORT=YES, SORTALLOC=YES, ENABLE=I FNOTCAT,
              MAXGENERATI ON=6, MAXOCCURRENCES=1,
              DELETE=PURGE, EXPI RE=PURGE
/*
```

**55.20 CATALOG MAINTENANCE UTILITY OVERVIEW (FDRABRCM)**

AUTOMATIC BACKUP & RECOVERY provides a utility program, FDRABRCM, which permits users to:

- . . .Purge entries from ABR scratch catalog that have expired.
- . . .Purge entries from ABR scratch catalog that are within a specified date range.
- . . .Purge backup data set entries from the ABR catalog.
- . . .Define base GDG entries for conversion from OS/CVOL to ICF VSAM catalog.
- . . .Simulate all of the functions mentioned above.

**WHY A  
CATALOG  
UTILITY**

This utility provides the user with an easy method of purging the ABR catalog of unwanted entries. This gives the user better utilization of space on the ABR catalog.

**SCRATCH  
PURGE RE-  
QUIREMENTS**

Data set(s) cataloged on the ABR scratch catalog are considered eligible for purge processing if the data set entry on the scratch catalog does not have a backup tape entry cataloged on the ABR backup catalog or the user specified a backup tape date range made available through keyword operands.

**BACKUP  
PURGE RE-  
QUIREMENTS**

Data set entries cataloged on the ABR backup catalog are considered eligible for purge processing if the entries fall outside the range set within the ABR model for the DASD volume(s) having ABR models, the range is developed using the current generation and the maximum generation value found within the ABR model. The user may limit the search by specifying selective operands as described within this section under purge backup command, giving the user greater flexibility. The **most current** generation group will never be purged from the ABR backup catalog, unless the user specifies **"FORCE"** operand.

**NO ABR  
MODEL  
OR MSS**

The selected volume entries within the ABR backup catalog do not have a corresponding ABR model. If the volume backup is on a MSS system or the volume is offline the ABR model can not be retrieved. The user must code the 'MAXGEN=' operand to supply the value normally taken from the ABR model also the current generation and cycle values are derived from the highest dated catalog entry for a specific volume.

**REPORT  
FORMATS**

Two report formats are available through the catalog utility. The user can use the 'FORMAT=' operand to specify the format that the user wants, or the user can let ABR choose the format based on the allocation of the report data set.

CRT FORMAT: Uses an 80-character print line and is intended for use on a cathode ray tube terminal. If the format operand is not specified, ABR will select this format if the report data set is allocated to a TSO terminal.

PRT FORMAT: Uses an 121-character print line, including carriage control characters. This format is intended for use on a hard-copy printer. If the format operand is not specified, ABR will select this format if the report data set is allocated to anything other than a TSO terminal.

**55.21 CATALOG UTILITY JCL REQUIREMENTS**

The following Job Control Statements are required to execute the ABR catalog utility:

**JOB  
STATEMENT**

The JOB statement is user-specified and depends upon installation standards.

**EXEC  
STATEMENT**

Must specify the name of the ABR catalog utility program (FDRABRCM). It may also contain the region requirements of 256K. The user can specify any 'PURGE' command as parm data on the EXEC statement.

**STEPLIB OR  
JOBLIB DD  
STATEMENT**

If required, must specify the load module library in which ABR resides. In VS systems, care must be taken to insure the library is authorized.

**SYSPRINT DD  
STATEMENT**

Specifies the primary output message data set. This is a required DD statement for all functions and is usually a SYSOUT data set.

**ABRMAP DD  
STATEMENT**

Specifies the report data set. When ABRMAP is not found within the JCL stream, the reports will be output to the SYSPRINT data set.

**SYSIN DD  
STATEMENT**

Specifies the control statements data set required for all ABR functions. Usually an input stream or DD \* data set.

## 55.22 THE PURGE SCRATCH COMMAND -- FORMAT

**PURGE** *SCRATCH* / *SCR*  
*,BKDATE=yyddd* / *,BKDAYS=nnnn*  
*,DSN=(dsname,...,dsname)*  
*,DSG=(dsgrout,...,dsgrout)*  
*,FORMAT=PRT* / *CRT*  
*,LINECNT=nn*  
*,LIST=ALL* / *ERR*  
*,RC=nnnn*  
*,SELTERR=YES* / *NO*  
*,SIMULATE*  
*,VOL=(vvvvvv,...,vvvvvv)*  
*,VOLG=(vvvv,...,vv)*

**PURGE SCRATCH COMMAND** The PURGE scratch command enables the user to select data set entries that will be uncataloged from the ABR scratch catalog. Scratch catalog entries selected for PURGE processing must satisfy both user selection criteria and ABR requirements (documented in the beginning of this section).

<b>OPERANDS</b>	<b>BKDATE=</b>	Specifies that all data set(s) entries found on the ABR scratch catalog having an active ABR backup tape that is equal to or lower than the JULIAN date specified will be considered eligible for PURGE processing.  The default is backup date will not participate in entry selection.
	<b>BKDAYS=</b>	Specifies that all data set(s) entries found on the ABR scratch catalog having an active ABR backup tape that is equal to or lower than the JULIAN date calculated from today's date minus the value specified by the operand of 'BKDAYS=' will be eligible for PURGE processing.  The default is backup date will not participate in entry selection.

CONTINUED . . .

## 55.22 CONTINUED . . .

<b>DSN=</b>	<p>Specifies string(s) from 1 to 44 characters in length. All data sets having a name that matches the selection criteria (i.e.: compare length is 44) are selected. Multiple data set names may be specified if entered as =(C. .C,. . .,C. .C).</p> <p>The default is deferred to the DSG= operand.</p>
<b>DSG=</b>	<p>Specifies string(s) from 1 to 44 characters in length. All data sets having a name that matches the selection criteria (i.e.: compare length is the length of data specified) are selected. There is a special form of the DSG= operand. Leading periods (.) after DSG= indicates that the search argument begins after one (1) or more index levels. Each period indicates that one (1) or more index level is to be bypassed. Multiple data set groups may be specified if entered as =(c..c,...,c..c).</p> <p>The default is, if neither DSN= nor DSG= is specified, the data set name will not participate in entry selection.</p>
<b>FORMAT=</b>	<p>Specifies that the report is to be prepared using other than the default selected by the program. FORMAT=PRT produces an 121 character line and FORMAT=CRT produces an 80 character multiple line format.</p> <p>(See report formats at the beginning of this section for further explanation).</p>
<b>LINECNT=</b>	<p>Specifies the maximum number of lines each report page can contain. The number can be any value from 10 to 99, inclusive.</p> <p>The default is that each page will contain a maximum of 58 lines.</p>
<b>LIST=</b>	<p>Specifies whether the cataloged entries being selected should be listed.</p> <p>The default is LIST=ALL. If LIST=ERR is specified only entries in error will be listed.</p>
<b>RC=</b>	<p>Specifies the return code value that will be set upon non-zero completion of this command.</p> <p>The standard default is 12.</p>
<b>SELTERR=</b> <b>SELT=</b>	<p>Specifies whether unsatisfied selection criteria will cause the condition code to be set to a non-zero value.</p> <p>The default is YES.</p> <p>NOTE: DSN=/DSG= and VOL=/VOLG= are the operands that are checked for unsatisfied selection.</p>
<b>SIMULATE=</b> <b>SIM</b>	<p>Specifies that the ABR catalog utility will process all selection criteria and inform the user what ABR catalog entries will be purged when the operand is excluded from the command string.</p> <p>The default is PURGE processing will be attempted.</p>
<b>VOL=</b>	<p>Specifies a DASD volume serial number. Data set(s) found in the ABR scratch catalog which were scratched from that volume will be selected for processing. This is an exact match operand (i.e.: compare length 6). Multiple volume serial numbers may be specified if entered =(V. . .V,. . .,V. . .V).</p> <p>The default is deferred to the VOLG= operand.</p>
<b>VOLG=</b>	<p>Specifies a prefix for DASD volume serial number(s). Data set(s) found in the ABR scratch catalog which were scratched from a volume beginning with this prefix will be selected for processing. This is not an exact match operand (i.e.: compare length is from 1 to 6 inclusive). Multiple volume groups may be specified if entered =(v. . .v,. . .,v. . .v).</p> <p>The default is, if neither VOL= nor VOLG= is specified, the DASD volume will not participate in entry selection.</p>



## 55.23 PURGE BACKUP COMMAND -- FORMAT

**PURGE   BACKUP****,BKDATE=yyddd | ,BKDAYS=nnnn****,COPY=1 | 2****,CYCLE=( nn,...,nn ) | ALL****,CURRINFO=MODEL | CATLG****,FORCE****,FORMAT=PRT | CRT****,GEN= ( nn,...,nn )****,LINECNT=nn****,LIST=ALL | ERR****,MAXGEN=nnnn | DEFAULT****,NOMODEL****,RC=nnnn****,SELTERR=YES | NO****,SIMULATE****,VOL=(vvvvvv,...,vvvvvv)****,VOLG=(vvvv,...,vv)**

CONTINUED . . .

## 55.23 CONTINUED . . .

**PURGE  
BACKUP  
COMMAND**

The PURGE backup command enables the user to maintain the ABR catalog as described by the limits within the ABR model. The user can also selectively PURGE ABR catalog entries by using operands described below. Backup catalog entries selected for PURGE processing must satisfy both user selection criteria and ABR requirements ([documented in Section 55.20](#)).

<b>OPERANDS</b>	<b>BKDATE=</b> Specifies that all ABR backup entries cataloged which have a backup date equal to or lower than the JULIAN date specified will be considered eligible for PURGE processing.  The default is backup date will not participate in entry selection.
	<b>BKDAY=</b> Specifies that all ABR backup entries cataloged which have a backup date that is equal to or lower than the JULIAN date calculated from today's date minus the value specified by the operand 'BKDAY=' will be considered eligible for PURGE processing.  The default is backup date will not participate in entry selection.
	<b>COPY=</b> Specifies a unique copy number the user wishes to process.  The default, if COPY= is not specified on the PURGE command, both copies will select all cycles, excluding cycle zero entries always and entries from the range developed using current generation and the maximum generation value for a volume.
	<b>CYCLE=</b> Specifies one or more cycle number(s) the user wishes to select for processing. The user may specify 'CYCLE=ALL', which will select all cycles, excluding cycle zero entries always and entries from the range developed using current generation and the maximum generation value for a volume.  The default, if CYCLE= is not specified on the PURGE command, are all cycles within generations except the most current cycle indicated by the ABR model for the volume.
	<b>CURRINFO=</b> Specifies what source contains the correct current generation and cycle values when the ABR model and ABR backup entries conflict. The user can indicate by coding 'CURRINFO=MODEL' that the ABR model contains the correct value or 'CURRINFO=CATLG' indicating the ABR backup entry with the highest date contains the most current information.  The default, no default is taken unless the volume(s) selected have no ABR model available. When the above condition exists 'CURRINFO=CATLG' is set by the program which also requires 'MAXGEN=' operand to be specified.
	<b>FORCE</b> Specifies that the "Backup Purge Requirements" documented at the beginning of this section will <b>not</b> be considered when determining purge eligibility. This operand also <b>requires</b> the use of the <b>VOL=</b> operand.
	<b>FORMAT=</b> Specifies that the report is to be prepared using other than the default selected by the program. FORMAT=PRT produces an 121 character line and FORMAT=CRT produces an 80 character multiple line format.  (See report formats at the beginning of this section for further explanation).
	<b>GEN=</b> Specifies one or more generation number(s) the user wishes to select for processing. this value can be any generation except the most current generation unless FORCE is also specified.  The default, if GEN= is not specified on the PURGE command, are the entries found outside the limits set within the ABR model DSCB for the volume.

CONTINUED . . .

## 55.23 CONTINUED . . .

<b>LINECNT=</b>	<p>Specifies the maximum number of lines each report page can contain, the number can be any value from 10 to 99, inclusive.</p> <p>The default is that each page will contain a maximum of 58 lines.</p>
<b>LIST=</b>	<p>Specifies whether the cataloged entries being selected should be listed.</p> <p>The default is LIST=ALL. If LIST=ERR is specified only entries in error will be listed.</p>
<b>MAXGEN=</b>	<p>Specifies a maximum number of generations to keep in the ABR backup catalog for volume(s) specified by the user. This value overrides the value kept within the ABR model or is used if the ABR model is not available at the time of execution. The user may also code 'MAXGEN=DEFAULT' which directs the program to use the ABR standard default, which is normally 4.</p> <p>The default, if the ABR model is available the 'MAXGEN=' value is taken from the model. When the ABR model is not available this operand is required for processing.</p>
<b>NOMODEL</b>	<p>Specifies that only volume entries within the ABR backup catalog not having a corresponding ABR model will be selected for processing.</p> <p>The default is only ABR backup entries having an ABR model available will be selected. When no model condition exists 'CURRINFO=CATLG' is set by the program which also requires 'MAXGEN=' operand to be specified.</p>
<b>RC=</b>	<p>Specifies the return code value that will be set upon non-zero completion of this command.</p> <p>The standard default is 12.</p>
<b>SELTERR=</b> <b>SELT=</b>	<p>Specifies whether unsatisfied selection criteria will cause the condition code to be set to a non-zero value.</p> <p>The default is YES.</p> <p>NOTE: DSN=/DSG= and VOL=/VOLG= are the operands that are checked for unsatisfied selection.</p>
<b>SIMULATE</b> <b>SIM</b>	<p>Specifies that the ABR catalog utility will process all selection criteria and inform the user what ABR catalog entries will be PURGED when the operand is excluded from the command string.</p> <p>The default is PURGE processing will be attempted.</p>
<b>VOL=</b>	<p>Specifies a DASD volume serial number. ABR backups in the ABR catalog for that volume will be selected. This is an exact match operand (i.e.: compare length 6). Multiple volume serial numbers may be specified if entered =(v...v,...,v...v).</p> <p>The default is deferred to the VOLG= operand.</p>
<b>VOLG=</b>	<p>Specifies a prefix for DASD volume serial number(s). ABR backups in the ABR catalog for volumes beginning with that prefix will be selected. This is not an exact match operand (i.e.: compare length is from 1 to 6 inclusive). Multiple volume groups may be specified if entered =(v...v,...,v...v).</p> <p>The default is, if neither VOL= nor VOLG= is specified, the DASD volume will not participate in entry selection.</p>

## 55.24 MAINT SCRATCH COMMAND -- FORMAT

MAINT *SCRATCH* / *SCR**,CATALOG=c...c**,DSN=(dsname,...,dsname)**,DSG=(dsgrout,...,dsgrout)**,LIMIT=nnn* / *4**,LIST=ALL* / *ERR**,SIMULATE**,VOL=(vvvvvv,...,vvvvvv)**,VOLG=(vvvv,...,vv)*MAINT  
SCRATCH  
COMMAND

The MAINT SCRATCH command defines GDG base entries in the ICF VSAM ABR catalog for all PSEUDO GDG SCRATCH entries that exist in the ABR OS/CVOL catalog.

The installation control library loaded during installation ([See Section 90.06](#)) contains JCL member “ABRCNVRT” which will define the ICF VSAM catalog, execute the MAINT command and execute the IBM IDCAMS CNVTCAT command.

**WARNING: This command is only to be run if you have installed the scratch exit with the ABR catalog as a CVOL, and you are now converting the ABR catalog to ICF VSAM. This function need only be done one time. The 5.0 version of the SCRATCH Exit will define any new GDG base entries when the ABR catalog is VSAM.**

OPERANDS **CATALOG=**

This operand is required and specifies the name of the ICF VSAM catalog in which the GDG base entries are to be defined.

**DSN=**

Specifies string(s) from 1 to 44 characters in length. All data sets having a name that matches the selection criteria (i.e.: compare length is 44) are selected. Multiple data set names may be specified if entered as =(c. .c,. . .,c. .c).

The default is deferred to the DSG= operand.

**DSG=**

Specifies string(s) from 1 to 44 characters in length. All data sets having a name that matches the selection criteria (i.e.: compare length is the length of data specified) are selected. There is a special form of the DSG= operand. Leading periods (.) after DSG= indicates that the search argument begins after one or more index level(s) is(are) to be bypassed. Multiple data set groups may be specified if entered as =(c. .c,. . .,c. .c).

The default is, if neither DSN= nor DSG= is specified, the data set name will not participate in entry selection.

CONTINUED . . .

## 55.24 CONTINUED . . .

<b>LIMIT=</b>	<p>Specifies the maximum number of generation data sets that can be associated with the generation data group to be defined.</p> <p>The default is 4.</p> <p>NOTE: If the default value is not used one of the following usermods must be applied, 'LFDHMVS' or 'LFDJMVS' to the MVS SCRATCH Exit (See Section 90.11). This modification is required so the SCRATCH exit can define the GDG base with the correct limit. See this usermod before executing this command.</p>
<b>LIST=</b>	<p>Specifies whether the cataloged entries being defined should be listed.</p> <p>The default is LIST=ALL. If LIST=ERR is specified only entries in error will be listed.</p>
<b>SIMULATE SIM</b>	<p>Specifies that the ABR catalog utility will process all selection criteria and inform the user what ABR catalog entries will be defined when the operand is excluded from the command string.</p> <p>The default is MAINT processing will be attempted.</p>
<b>VOL=</b>	<p>Specifies a DASD volume serial number. Data set(s) found in the ABR scratch catalog which were scratched from that volume will be selected for processing. This is an exact match operand (i.e.: compare length is 6). Multiple volume serial numbers may be specified if entered =(v. . .v, . . .,v. . .v).</p> <p>The default is deferred to the VOLG= operand.</p>
<b>VOLG=</b>	<p>Specifies a prefix for DASD volume serial number(s). Data set(s) found in the ABR scratch catalog which were scratched from a volume beginning with this prefix will be selected for processing. This is not an exact match operand (i.e.: compare length is from 1 to 6 inclusive). Multiple volume groups may be specified if entered =(v. . .v, . . .,v. . .v).</p> <p>The default is, if neither VOL= nor VOLG= is specified, the DASD volume will not participate in entry selection.</p>

**55.25 CATALOG UTILITY JCL EXAMPLES**

The following examples illustrate the most common ways of executing ABR catalog utility functions. Note that, for convenience, all STEPLIB/JOBLIB DD statements have been omitted in the examples; they may be required, depending on your installation's placement of ABR.

**EXAMPLE 1** This example illustrates the JCL required to produce a report detailing PURGE activity for any data sets that may have been scratched from a specific volume.

```
//PURGE      EXEC   PGM=FDRABRCM
//SYSPRI NT  DD     SYSOUT=A
//ABRMAP     DD     SYSOUT=A
//SYSUDUMP   DD     SYSOUT=A
//SYSI N     DD     *
PURGE        SCRATCH, VOL=PACK01
/*
```

**EXAMPLE 2** This example illustrates the JCL required to produce a report detailing PURGE activity against the ABR backup catalog for a specific DASD volume. Using the limits found within the ABR model.

```
//PURGE      EXEC   PGM=FDRABRCM
//SYSPRI NT  DD     SYSOUT=A
//ABRMAP     DD     SYSOUT=A
//SYSUDUMP   DD     SYSOUT=A
//SYSI N     DD     *
PURGE        BACKUP, VOL=TS0001
/*
```

**EXAMPLE 3** This example illustrates the JCL required to produce a report detailing PURGE activity against the ABR backup catalog for a specific DASD volume. Supplying the maximum generation because the ABR model for the volume is not available.

```
//PURGE      EXEC   PGM=FDRABRCM
//SYSPRI NT  DD     SYSOUT=A
//ABRMAP     DD     SYSOUT=A
//SYSUDUMP   DD     SYSOUT=A
//SYSI N     DD     *
PURGE        BACKUP, VOL=BI LLO3, MAXGEN=5
/*
```

**EXAMPLE 4** This example illustrates the JCL required to produce a report detailing PURGE activity against the ABR backup catalog for a specific DASD volume that no longer exists. This execution will result in the removal of all backup entries cataloged for the volume specified.

```
//PURGE      EXEC   PGM=FDRABRCM
//SYSPRI NT  DD     SYSOUT=A
//ABRMAP     DD     SYSOUT=A
//SYSUDUMP   DD     SYSOUT=A
//SYSI N     DD     *
PURGE        BACKUP, VOL=LI B003, FORCE
/*
```

**ABR**  
**AUTOMATIC BACKUP & RECOVERY**

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**56.01 ABR PROCESSING UNDER ISPF -- INTRODUCTION**

The ABR system includes panels that operate under the Interactive System Productivity Facility (ISPF) on MVS systems with TSO. These panels give end-users easy access to most of the user-oriented functions of ABR. [Section 56.02](#) gives examples of how an end user can use ABR with the panels under ISPF.

[Section 56.40](#) documents the new SEARCH, REPORT and SERVICES DIALOG (SRS).

The installation and customization of the ABR dialogs is documented in [Sections 92.08, 92.09](#) and [92.10](#).

**INTRO-  
DUCTION**

The ABR system is composed of three (3) major subsystems: ARCHIVING, BACKUP and REPORTING.

ARCHIVING is the process of removing data sets from disk, and putting them instead onto a less expensive storage medium (such as tape), or even onto disk, with gains from the reduced amount of space required (especially if the compress option is used). ABR enables the installation to make a variety of rules about when a data set is considered to be "not needed on disk." A simple rule would be that any data set that has not been used at all for a period of thirty (30) days will be archived.

BACKUP is the process of making a copy of disk data sets so that you can recover them if they are damaged. At some interval, typically once a day, the computer center runs an ABR backup of the disk volumes. The backup job automatically selects for backup all data sets that have been changed since the last time the job ran. So, on each day that you change one of your data sets, ABR will make a new backup copy; therefore if something goes wrong, you will not lose more than one day's work.

**FEATURES**

Some of the features of the ABR ISPF panels are:

- Complete data set and volume reporting.
- Report on data sets and their backups.
- Reports on archived data sets.
- Reports may be either sent directly to the terminal; scrolled; or scrolled and printed.
- Archive or backup data sets.
- Restore data sets from archive or backup.
- Data set archive, backup and restores may be done via the remote queue, or by submission of a batch job, or immediately in the TSO foreground.
- Schedule data sets to be backup up or archived.
- COMPAKTOR map and simulation.
- COMPAKTOR space release (real and simulation)
- Complete ISPF tutorial (HELP) panels and messages.
- Installation options to restrict access to certain functions, either globally or by user or group.
- The new Search, Report and Services dialog (SRS) provides fast data set and volume reporting in the form of data set lists and volume lists. ABR and other services may be requested against the selected entries. Data set selection consists of over 100 data set attributes, the selection may run against the catalog, specified volume serials, the ABR archive file, the ABR scratch catalog or an FDREPORT extract data set.

FIGURE #1

```

----- I SPF/PDF PRIMARY OPTION MENU -----
OPTION ==> A_

0 I SPF PARMS      - SPECIFY TERMINAL AND USER PARAMETERS
1 BROWSE           - DISPLAY SOURCE DATA OR OUTPUT LISTINGS
2 EDIT            - CREATE OR CHANGE SOURCE DATA
3 UTILITIES        - PERFORM UTILITY FUNCTIONS
4 FOREGROUND       - NVOKE FOREGROUND LANGUAGE PROCESSORS
5 BATCH           - SUBMIT JOB FOR LANGUAGE PROCESSING
6 COMMAND          - ENTER TSO COMMAND OR CLIST
7 DIALOG TEST      - PERFORM DIALOG TESTING
8 LM UTILITIES     - PERFORM LIBRARY ADMINISTRATOR UTILITY FUNCTIONS
9 IBM PRODUCTS     - ADDITIONAL IBM PROGRAM DEVELOPMENT PRODUCTS
A FDR/ABR          - PERFORM SELECTED DASD MANAGEMENT FUNCTIONS
C CHANGES         - DISPLAY SUMMARY OF CHANGES FOR THIS RELEASE
T TUTORIAL         - DISPLAY INFORMATION ABOUT I SPF/PDF
X EXIT            - TERMINATE I SPF USING LOG AND LIST DEFAULTS

USERID -DF
TIME -10:00
TERMINAL -3279
PF KEYS -24
DATE -03/03/89
JULIAN -89.062
APPLID -ISR

ENTER END COMMAND TO TERMINATE I SPF.

```

**FIGURE #1** Shows how the ISPF Primary Option Menu will appear to an ABR user. After the user selects `OPTION ==> A` the FDRABR Primary Option Menu will be displayed. You can also go directly from the ISPF/PDF primary option menu to a specific ABR service by entering `A.N`, where `N` is the number or letter for the service you want.

FIGURE #2

```

----- FDR TOTAL DASD MANAGEMENT SYSTEM--FDR PRIMARY OPTIONS MENU -----
OPTION ==> 2_                                     V 5.2/30

1 REPORTS          - ABR REPORTING FUNCTIONS
2 RESTORE           - ABR DATA SET RESTORE
3 ARCHIVE           - ABR DATA SET ARCHIVE OR SUPERSCRATCH
4 BACKUP            - ABR DATA SET BACKUP
5 REMOTE Q          - ABR REMOTE QUEUE UTILITY FUNCTIONS

C COMPAKTOR         - COMPAKTOR MAP AND SIMULATION REPORTS
R RELEASE           - COMPAKTOR RELEASE

I INSTALL           - INSTALLATION AND MAINTENANCE OF FDR/ABR/CPK
J JCL PARMS         - SPECIFY FDR JCL AND SYSOUT DEFAULTS FOR SUBMITTED JOBS
K FORMAT            - MODIFY FORMAT OF GENERATED REPORTS

M MESSAGES          - FDR MESSAGES AND CODES QUERY FACILITY
Q QUERY             - FDR/ABR STATISTICS QUERY

S SRS               - SEARCH, REPORT, SERVICES DIALOG

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```

**FIGURE #2** displays all of the available options of the FDRABR Primary Option Menu. In this example we want to restore a data set. `OPTION ==> 2` permits a user to restore data sets from either the backup or archive subsystem. **FIGURE #3** illustrates the restore panel.

**NOTE:** If your panels differ from the following examples it is possible that your installation has restricted or eliminated some of the options.

FIGURE #3

```

----- FDR AUTOMATIC BACKUP & RECOVERY -- FDRABR RESTORE PANEL 1 -----
SELECT OPTION ==>
  BLANK - ARCHIVE RESTORE
  B - BACKUP RESTORE

PROCESS OPTION ==> B
  BLANK - PLACE IN REMOTE QUEUE
  B - SUBMIT A BATCH PROGRAM
  F - PERFORM IN FOREGROUND

GENERATION ==> CYCLE ==>
  PROJECT ==> JJM
  LIBRARY ==> JCL
  QUALIFIER ==> CNTL _

NEW PROJECT ==>
NEW LIBRARY ==>
NEW QUALIFIER ==>

OTHER DSNAME/FILTER ==>
OTHER DATA SET GROUP ==>
OTHER NEW NAME ==>
OTHER NEW GROUP NAME ==>

PRESS THE DOWN KEY (PF8/20) FOR MORE OPTIONS . . . PRESS THE ENTER KEY TO PROCESS.

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```

**FIGURE #3** (Option A.2) illustrates the use of the FDRABR RESTORE panel to submit a batch job to restore a data set from ARCHIVE. To request an ABR restore, all you have to know is the data set name. ABR will automatically figure out which tape contains the most recently ARCHIVED copy of this data set. At the completion of the restore the user will be notified.

FIGURE #4

```

----- FDR AUTOMATIC BACKUP & RECOVERY--FDRABR REMOTE QUEUE PANEL -----
SELECT OPTION ==> 2
  BLANK - RESTORE FROM ARCHIVE
  2 - RESTORE FROM BACKUP
  3 - ARCHIVE DATA SET
  4 - BACKUP DATA SET
  5 - REMOVE ARCHIVE RESTORE
  6 - REMOVE BACKUP RESTORE
  7 - LIST BOTH REMOTE QUEUES

PROJECT ==> LLS
LIBRARY ==> ABR
QUALIFIER ==> CNTL

NEW PROJECT ==>
NEW LIBRARY ==> ABR2 _
NEW QUALIFIER ==>

OTHER DSNAME/FILTER ==>
OTHER DATA SET GROUP ==>
OTHER NEW NAME ==>
OTHER NEW GROUP NAME ==>

PRESS THE DOWN KEY (PF8/20) FOR MORE OPTIONS . . . PRESS THE ENTER KEY TO PROCESS.

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```

**FIGURE #4** (Option A.5) illustrates the use of the FDRABR Remote Queue panel to restore a data set from backup. This request will be combined with restore requests from other users, and the set of restores will be done in a single job run by the computer center, typically two or three times a day. In this example, the data set will be restored to a different name, so that the copy that is presently on disk will not be disturbed. At the completion of the restore the user will be notified.

FIGURE #5

```

----- FDR AUTOMATIC BACKUP & RECOVERY--FDRABR REPORT PANEL -----
REPORT OPTION ===>
BLANK - ARCHIVE
2 - BACKUP
3 - SCRATCH
4 - CATALOG
5 - VOLUME STATUS
6 - FDREPORT
ENTER 'C' TO CHANGE FORMAT ===>
PRINT ALL AVAILABLE BACKUPS
CREATE DETAIL AND SUMMARY REPORTS
REPORT TO SCROLL DATA SET
DISPLAY IN TSO FORMAT
CREATE 58 LINES PER PAGE

FDREPORT NAME ===>

PROJECT ===> JJM _
LIBRARY ===>
QUALIFIER ==>

OTHER DATA SET NAME ===>
OTHER DATA SET GROUP ==>

VOLUME SERIAL ===>
VOLUME GROUP ===>

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```

**FIGURE #5** (Option A.1) illustrates the use of the FDRABR REPORT panel to display information concerning all of the data sets that have been ARCHIVED for a particular userid. Figure #5A shows the results.

FIGURE #5A

```

BROWSE--LLS AREP036. ABRMAP ----- LINE 000000 COL 001 080
COMMAND ===> _
***** TOP OF DATA *****-CAPS ON-**

DSN-JJM. JCL. ANGELA                                DVOL-SCR501 3350          VSEQ---1
ARCHIVE DATE-84. 339 BK/TY(1)-3400-5                EXT--1              NO/TRK----5
DSORG--PO RECFM--FB BK/TY(2)-*N/A BLKSIZE--12960 LRECL-----80 RECALL LBP-----0
TDSN(1)-FDRABR. VSCR501. B1843390 EXPDT-85. 339 FILE---1 VOL-MI D351

DSN-JJM. JCL. JENNIFER DVOL-SCR501 3350          VSEQ---1
ARCHIVE DATE-84. 310 BK/TY(1)-3350                EXT--1              NO/TRK----5
DSORG--PO RECFM--FB BK/TY(2)-*N/A BLKSIZE--12960 LRECL-----80 RECALL LBP-----0
TDSN(1)-FDRABR. VSCR501. B1843105 EXPDT-85. 310 FILE---0 VOL-I DPLB3

DSN-JJM. JCL. PATTY DVOL-SCR375 3375          VSEQ---1
ARCHIVE DATE-84. 354 BK/TY(1)-3350                EXT--1              NO/TRK----5
DSORG--PO RECFM--FB BK/TY(2)-*N/A BLKSIZE--12960 LRECL-----80 RECALL LBP-----0
TDSN(1)-FDRABR. VSCR375. B1843540 EXPDT-85. 354 FILE---0 VOL-MVSCAT

```

**FIGURE #5A.** The following information is displayed for each ARCHIVED data set: the data set name, the volume serial number and the device type on which it was formerly located, the date it was archived, the device type(s) to which it was archived, the size and the DCB attributes of the data set, the data set's security attributes, if any, 'RECALL' if the data set is set up for automatic recall; and the data set name, expiration date, file sequence number, and volume serial(s) of the archive file(s).

FIGURE #6

```

----- FDR AUTOMATIC BACKUP & RECOVERY -- FDRABR REPORT PANEL -----
REPORT OPTION ==> 2
BLANK -- ARCHIVE
2 -- BACKUP
3 -- SCRATCH
4 -- CATALOG
5 -- VOLUME STATUS
6 -- FDREPORT

ENTER 'C' TO CHANGE FORMAT ==>
PRINT ALL AVAILABLE BACKUPS
CREATE DETAIL AND SUMMARY REPORTS
REPORT TO SCROLL DATA SET
DISPLAY IN TSO FORMAT
CREATE 58 LINES PER PAGE

FDREPORT NAME ==>

PROJECT ==>
LIBRARY ==>
QUALIFIER =>

OTHER DATA SET NAME ==> 'SYS1.PARMLIB' _
OTHER DATA SET GROUP ==>

VOLUME SERIAL ==>
VOLUME GROUP ==>

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```

FIGURE #6 (Option A.1) illustrates the use of the FDRABR REPORT panel to display information concerning all of the available backups for a specific data set. Figure #6A shows the results.

FIGURE #6A

```

BROWSE-- LLS.AREPO36.ABRMAP ----- LINE 000000 COL 001 072
COMMAND ==> _
***** TOP OF DATA *****--CAPS ON--**

DSN--SYS1.PARMLIB
LAST REF--92.349 DSORG---PO ALLOC-----45 VOL--MVSRS1 3390 VSEQ----1
FREE-----7
***** BACKUP INFORMATION *****
BDATE(00)--92.349 SFX--C1001600 FN--001 VOLS--B00765, B00766
BDATE(01)--92.343 SFX--C1001500 FN--001 VOLS--B00857, B00875
BDATE(02)--92.335 SFX--C1001400 FN--001 VOLS--B00771, B00781
BDATE(03)--92.326 SFX--C1001300 FN--001 VOLS--B00955, B00956
BDATE(04)--92.321 SFX--C1001200 FN--001 VOLS--B00865, B00866
BDATE(05)--92.320 SFX--C1001104 FN--023 VOLS--B00861
BDATE(06)--92.314 SFX--C1001100 FN--001 VOLS--B00980, B00981

FDR426 PROCESSING OF VOLUME MVSRS1 COMPLETED
FDR499 FDRABRV(5.2) PROCESSING COMPLETED
FDR999 FDRABRP (5.2) PROCESSING COMPLETED
***** BOTTOM OF DATA *****--CAPS ON--**

```

**FIGURE #6A** The following backup information is displayed for the requested data set: Data set name, volume serial number, last reference date, data set organization, and size. For each of the recent backups, the report displays the backup date, the dsname suffix (which contains the generation and cycle numbers), the file sequence number, and the volume serial number(s). (Information on backups other than the most current is only available when the installation activates the OLDBACKUP feature.) If the user wants to restore the data set to its condition as of a certain date, then note the number (in parentheses) for that BDATE, and enter this number as the BACKUP SOURCE on panel A.2 or A.5.

FIGURE #7

```

----- FDR TOTAL DASD MANAGEMENT SYSTEM -- COMPAKTOR MAP/SI MULATI ON PANEL-----
SELECT OPTI ON ===> _
BLANK - MAP
F - SI MULATE FASTCPK
S - SI MULATE COMPAKTI ON
R - SI MULATE RELEASE

VOLUME SERI AL(S) ===>

PS RELEASE OPTI ON ===> %FREE ===>O
PO RELEASE OPTI ON ===> %FREE ===>O
VSAM RELEASE OPTI ON ===> %FREE ===>O
BLANK - DO NOT RELEASE
A - ALL UNUSED
R - ROUND (PS/PO)
T - ALL UNUSED TO TRACK (PS/PO)

TEMPORARY DATASETS===>
BLANK -DELETE K - KEEP

PROCESSI NG OPTI ON ===>B
BLANK - FOREGROUND
B - BATCH

MERGE VSAM EXTENTS ===>YES (YES, NO)

REPORT FORMAT ===> (C=CHANGE)
PRI NT BOTH BEFORE AND AFTER MAPS
PRI NT EXTENT MAP AND SUMMARY REPORT
REPORT TO SCROLL DATA SET FORCED
HI GH LI GHTI NG I S NOT REQUI RED
CREATE 58 LI NES PER PAGE

----- COPYRI GHT 1986, 1992 --- I NNOVATI ON DATA PROCESSI NG, I NC. -----

```

**FIGURE #7** (Option A.C) illustrates the COMPAKTOR MAP and SIMULATION panel. This example shows a user submitting a batch job to SIMULATE the compaction of a volume named IDPLB3, with all the unused tracks in sequential and partitioned data sets being released. NOTE: The COMPAKTOR SIMULATION output is illustrated in [Section 40.25](#).

FIGURE #8

```

----- FDR TOTAL DASD MANAGEMENT SYSTEM -- COMPAKTOR RELEASE PANEL -----
COMMAND ===> B

S - SELECT DATASETS F - FOREGROUND RELEASE B - BATCH RELEASE E - EDI T BATCH RELEASE

SI MULATI ON      ===> YES
VOLUME SERI AL    ===> TSO*

MI NRLSE          ===> O      MI NI MUM NUMBER OF TRACKS TO RELEASE PER VOLUME
NOSECON D=RLSE    ===> NO     RELEASE I F SECONDARY SPACE ALLOCATI ON I S NOT DEFI NED
LBPZERO=VALI D    ===> NO     RELEASE DATA SETS WI TH LAST BLOCK POI NTER OF ZERO

PS RELEASE        ===> ALL    %FREE ===> 0  RELEASE OPTI ON S:      ( NO ALL ROUND TRACK )
PO RELEASE        ===> ALL    %FREE ===> 20  RELEASE OPTI ON S:      ( NO ALL ROUND TRACK )
VSAM RELEASE      ===> NO     %FREE ===> 0  RELEASE OPTI ON S:      ( NO ALL )

OUTPUT FORMAT     ===> (C=CHANGE)
PRI NT BOTH BEFORE AND AFTER MAPS
PRI NT EXTENT MAP AND SUMMARY REPORT
REPORT TO SCROLL DATA SET - FORCED
HI GH LI GHTI NG I S NOT REQUI RED
CREATE 58 LI NES PER PAGE

----- COPYRI GHT 1986, 1992 - I NNOVATI ON DATA PROCESSI NG, I NC. -----

```

**FIGURE #8** (Option A.R) illustrates the COMPAKTOR Release Panel. On this panel you can request that free space be released from PS, PO, and/or VSAM data sets on a volume or group of volumes. This can be done in simulation or for real, and can be submitted as a batch job or done immediately in the foreground under TSO. In this example, the user is requesting a batch job to simulate releasing space from all PS and PO data sets on all TSO volumes, leaving 20% free space in PDSs.

**56.40 FDRSRS – SEARCH, REPORT AND SERVICES DIALOG****INTRODUCTION**

The FDRSRS ISPF dialog provides a fast and easy way of selecting, reporting and performing services against data sets and volumes. FDRSRS uses FDREPORT to do most of the data gathering and formatting, but it makes the selection and display of the data very easy to do. Various commands and functions can be executed against the data displayed. It can be used by all types of ISPF users, from DASD managers to end-users. FDRSRS is divided into a Data Set Application and a Volume Application.

**SRS is superior to the data set and volume functions of ISMF and ISPF 3.4 in speed, flexibility, and ease of use.**

**DATA SETS**

The Data Set Application selects data sets from a variety of sources, reports the requested data set attributes (VOLSER, DSORG, RECFM, BLKSIZE, etc. over 150 selectable attributes), and performs ABR and other services against the selected data sets. The sources that may be searched are system catalogs, VTOCs of online volumes, the ABR Archive Control file, the ABR Scratch Catalog, or an extract file created by FDREPORT or FDRSRS.

The Data Set Selection Criteria Panel displays rows of data set attributes and columns where the user may specify selection, reporting, summary, and sorting criteria. Additionally, each row has columns describing the attribute.

The Data Set List Panel displays rows containing the selected data sets and columns containing the requested (or defaulted) data set attributes. Additionally, each row contains a command column where the user may request ABR services (such as Recall, Reorg, Copy), ISPF services (such as Edit, Browse), TSO commands (such as DELETE, LISTDS), CLISTS, and REXX execs. The format of the data set list can be easily modified. You can specify which data set attributes should be displayed and in what order (or let SRS pick the order). You can print out hardcopy of any Data Set List.

**VOLUMES**

The Volume Application selects online volumes and reports the requested volume attributes (over 50 selectable attributes).

The Volume Selection Criteria Panel displays rows of volume attributes and columns where the user may specify selection, reporting, summary, and sorting criteria. Additionally, each row has columns describing the volume attribute and its output length.

The Volume List Panel displays rows containing the selected volumes and columns containing the requested (or defaulted) volume attributes.

**SAVING LISTS**

The selection, report, summary and sort criteria specified may be saved on disk as a member in the Selection Criteria set of libraries. To allow for further customization of the Selection Criteria, a user comments area is provided and each row contains a command column where commands may be issued to delete unwanted rows, repeat rows, or move rows before or after other rows. This allows users to save commonly used selection and reporting criteria for reuse. Storage Managers may also setup criteria for use by other users.

A Data Set or Volume List (the output of SRS) may be also saved on disk for later use. When a List is saved, its associated Selection Criteria is also saved. A saved List may be refreshed in the future using its original Selection Criteria. Additionally, the Selection Criteria associated to a Data Set or Volume List may be modified and processed in the future. The Data Set or Volume List is saved as a member in the List set of libraries.

**TRY IT!**

The following sections provide an overview of SRS with simple examples. The power of SRS can be appreciated only by experimenting with it. Context-sensitive HELP is available at every point within SRS. The panels you see may differ slightly from those printed here.

**Note:** Module FDRSRSA must be placed in the TSO authorized program name table before FDRSRS is invoked. Please refer to [Section 90](#) for instructions on updating this table.

CONTINUED . . .

## 56.40 CONTINUED . . .

**ISPF DIALOG FOR ABR:**

The SRS dialog (Search, Report and Services) is much faster and more flexible than ISPF option 3.4 or the Data Set Application of ISMF. The SRS panels allow you to select data sets from different sources, namely the catalog, online volumes, the ABR archive control file, the ABR scratch catalog or an FDREPORT extract file. Over 100 data set attributes such as RECFM, LRECL, LRDATE, SIZE, etc., can be used for selection, for sorting, and for displaying in the generated Data Set List.

From the data set list panel, the user may perform many ISPF or ABR operations, such as Browse, Edit, Backup, Restore or any TSO command, CLIST or REXX EXEC.

The format of the data set list can be easily modified by the user. The user can specify which data set attributes should be displayed and in what order. Unlike ISMF, the user can print out hardcopy of any Data Set List.

**PANEL  
A.S.1****SAMPLE  
SELECTION  
CRITERIA  
PANEL**

```

-----DATASET SELECTION: DEFAULT -----LINE 1/142 COL 4:6/8
COMMAND ==> _                                SCROLL==> HALF

      Read      Save      Submit      Find      Locate      Extract      Options      Help
FIELD          SELECTION VALUE                                     REPORT      SORT
-----
SOURCE FIELDS
DSNAME ==> DF.**
VOL ==>
SOURCE ==> CATALOG (Catalog Volume Archive Scratch Extract)
CATALOGN ==>
ARCDSN ==>
VTOC FIELDS
DEFAULTS ==>
UNIT ==>
DEVTYPE ==>
VOLSQ ==>
DATES ==>
CRDATE ==>
CRDAYS ==>
SMS FIELDS
SMSCLASS ==>
STORCLAS ==>
MGMTCLAS ==>
DATACLAS ==>
STORGRP ==>
SMSFLAGS ==>

```

*Example  
of some  
VTOC and  
SMS fields  
that can be  
Selected,  
Sorted  
and/or  
Reported*

**PANEL A.S.2****SAMPLE  
DATA SET  
LIST PANEL**

```

-----DATASET LIST: DSLIST -----LINE 1/77 COL 4:10/10
COMMAND ==> _                                SCROLL==> HALF

      Read      Save      Find      Locate      Refresh      Next      Message      Printd      Help
COMMAND  DATA SET NAME          VOLSER      DSO      RECFM      BKSIZ      LRECL      ALLOC      FREE
-----
B         DF.ABRMAP                MIGRAT ARCHIVED
E         DF.ABRPANEL              MIGRAT ARCHIVED
          DF.ALTLIB.CLIST          SCRO83      PO      FB        8000      80      15      14
          DF.ANSWERS              IDPLB0      PS      VB        6233      84      1      0
          DF.APF.LOAD              IDPLB1      PO      U        32760     134     40
DELETE    DF.ARCHIVE              IDPLB0      DA      F        23392     1      0
          DF.ASM.MACLIB            IDPLB4      PO      FB        3280      80      12      3
REORG      DF.ASM.SOURCE           IDPLB4      PO      FB       19040     80     315     65
RESTORE    DF.CALL.LOG             IDPLB1      PO      FB        6192     72      23      2

```

Printd command allows the user to change the order in which the data set attributes are printed and the number of copies to print.

Data set **DF.ABRPANEL** is archived. Specifying B (Browse) in the command column will cause ABR to perform an automatic recall of this data set before going into Browse.

Data set **DF.ARCHIVE** is no longer required. Specifying DELETE will cause the data set to be scratched and uncataloged.

Data set **DF.CATALOG** needs to be restored. Specifying RESTORE in the command column will cause the data set to be restored.

Data set **DF.ASM.SOURCE** will be reorganized. Specifying REORG in the command line will invoke FDRREORG to compress this PDS



## 56.40 CONTINUED . . .

The SRS dialog is invoked by selecting option S in the FDR/ABR Primary Options Menu. For faster access, or if you wish to give users access to SRS without the other ABR dialogs, you may add the SRS option to the ISPF system command table. [Section 56.47](#) discusses fastpaths for invoking the SRS dialog, bypassing some of the preliminary SRS panels.

For simplicity, the panel names and options shown in the rest of this section assume that option A on the ISPF main menu is used for accessing the FDR/ABR Primary Options menu. So, you can get to the SRS Primary Menu by entering "S" on the FDR/ABR Primary Options Menu, or "A.S" on the ISPF Primary Options Menu.

### PANEL A.S SRS PRIMARY MENU

```

----- FDRSRS - Primary Menu -----
OPTION  ===> 1

0  OPTIONS  - Set Dialog Options and Defaults

1  SELECT   - Select Data Sets
               Selection Name ===> DEFAULT      ( * = display member list )

2  DSLIST   - Display Saved Data Set List
               List Name      ===> *            ( * = display member list )

3  SELVOL   - Select Volumes
               Selection Name ===> DEFAULT      ( * = display member list )

4  VOLLIST  - Display Saved Volume List
               List Name      ===> *            ( * = display member list )

```

The SRS primary menu is used to select the SRS function desired. **Option 0** allows each user to set options and defaults that affect his/her use of SRS. **Options 1** and **2** select the data set application, **options 3** and **4** select the volume application. The odd-numbered options actually select data sets or volumes; you can optionally retrieve a saved list of criteria. The even-numbered options retrieve a data set or volume list previously selected and saved.

The various name fields refer to members in SRS libraries of saved selection criteria and lists. The names of these libraries can be specified via option 0.2 or overridden by specifying blanks for the member name. The libraries can include private user SRS libraries and/or shared or installation-wide libraries.

The Selection Name field specifies the member name of a previously saved Selection Criteria, or one of the following special values:

DEFAULT	this is the built-in selection criteria starter set containing all the available fields.
blanks	display a panel containing the names of the libraries that will be used to read the Selection Criteria.
*	display a panel containing the names of the Selection Criteria that were previously saved.

The List Name field specifies the member name of a previously saved List, or one of the following special values:

blanks	display a panel containing the names of the libraries that will be used to read the List.
*	display a panel containing the names of the Lists that were previously saved.

**Note:** When the first SAVE command is specified, if the library specified in the SRS options as the READ/WRITE library for that type of save does not exist, the dialog will display a panel containing allocation parameters for creating the Selection Criteria or List library. There is no need to pre-allocate the FDRSRS libraries.

**56.41 SRS DIALOG OPTIONS AND DEFAULTS PANELS**

The FDRSRS Defaults and Options Panels are displayed by selecting option 0 from the main FDRSRS panel, or by issuing the command OPTIONS (or O) from the Selection Criteria panel or the List panel.

**PANEL A.S.0  
SRS OPTIONS  
AND  
DEFAULTS**

```

----- FDRSRS - User Options and Defaults -----
OPTION  ==>

Select an option or use PF8/20 (DOWN) to display the options panels in sequence

    1 - Processing Options

    2 - Data Set Names

    3 - Batch JCL submission options

    4 - Report format options

- - - - -

FF - FDR Function Commands (saved in a private table library)

FS - FDR Function Commands (for all users, saved in a common table library)

```

The panels which are invoked by each of these options are displayed on the following pages, to show you the options that are available. However, they are not described here. Please refer to the HELP tutorial for current and detailed information on the user options and defaults.

Options changed on these panels are permanently stored in the user's ISPF profile data set. To change installation-wide default option values, use ISPF to edit member FDRSRSD in the FDR panel library and follow the instructions contained in this member. (Note: the modification of an installation-wide default option value will only affect those users who have not explicitly changed the option value.) For example, you may want to provide libraries of saved queries and lists that any user can invoke; these can be specified as read-only libraries on the Default Data Set Names panel.

Most users of SRS will probably not need to modify the options.

CONTINUED . . .

## 56.41 CONTINUED . . .

**PANEL A.S.0.1**  
**SRS**  
**PROCESSING**  
**OPTIONS**

```

----- FDRSRS - Processing Options -----
OPTION   ==>

Number of selected data sets after which to suspend selection and display list:
  Suspend   ==> 100

Search only the specified catalog (i.e., do not switch to connected catalogs):
  Oneocat   ==> YES          (yes | no)

Report errors involving OS CVOLs (unsupported) and offline catalogs:
  Caterr    ==> NO          (yes | no)

Select all entries from the catalog (including tape data sets):
  Allent     ==> NO          (yes | no)

Execute the Selection Criteria when the Enter key is pressed, or RUN is entered:
  Execute    ==> ENTER       (Enter | Run)

Convert data set name into data set name filter for selection:
  Convert    ==> YES          (yes | no)

```

**PANEL A.S.0.2**  
**SRS DEFAULT**  
**DATA SET**  
**NAMES**

```

----- FDRSRS - Default Data Set Names -----
OPTION   ==>

Default Selection Criteria library names:
  Read/Write dsn ==> 'FDRABR.SRS.SELECT'
  Read only  dsn ==>
  Read only  dsn ==>

Default Data Set List/Volume List library names:
  Read/Write dsn ==> 'FDRABR.SRS.LIST'
  Read only  dsn ==>
  Read only  dsn ==>

Default FDREPORT Extract data set name:
  Extract dsname ==> 'FDRABR.SRS.EXTRACT'

Default ABR Archive Control File name (or blank):
  Archive dsname ==>

Default Catalog name where to search (or blank to use the master catalog):
  Catalog dsname ==>

```

**PANEL A.S.0.3**  
**SRS BATCH**  
**JCL OPTIONS**

```

----- FDRSRS - Batch Submission Options -----
OPTION   ==>

Job Statement Information:
  ==> //useridA JOB (ACCOUNT), 'NAME', NOTIFY=userid
  ==> /*
  ==> /*
  ==> /*

FDR Program Library for STEPLIB DD (blank if LINKLIST) :
  Steplib ==>

SYSOUT Class   ==> *

```

CONTINUED . . .

## 56.41 CONTINUED . . .

**PANEL A.S.0.4**  
**SRS REPORT**  
**FORMAT**  
**OPTIONS**

```

----- FDRSRS - Report Format Options -----
OPTION ==>

Date Format ==> YYDDD          ( YYDDD | MMDDYY | DDMMYY | YYYYDDD |
                               MMDDYYYY | DDMMYYYY )
Byte Format ==> KILOBYTES      ( bytes | kilobytes | megabytes )

Fold Dsname ==> YES          ( yes | no )

Backup Copy ==> EITHER        ( both | either | 1 | 2 )

Oldbackup ==> ALL             ( all | cur | (n,n,n,...) )

Optional FDREPORT DEFAULT statement:
==> DEFAULT

```

**PANEL**  
**A.S.0.FF/FS**  
**FDR**  
**FUNCTION**  
**COMMANDS**

```

----- FDRSRS - FDR Function Command --- ROW 1 TO 17 OF 17
COMMAND ==>                                SCROLL ==> PAGE
Select one of the following row selection codes, or press PF3 (END) to exit.
  S - Select  R - Repeat  I - Insert  D - Delete

Sel  Command  Command
Code Name    Description
-----
      ARCDL   DELETE DATA SET ENTRY IN THE ARCHIVE FILE      DEFAULT
      ARCHIVE ADD ARCHIVE REQUEST TO REMOTE QUEUE              DEFAULT
      ARCMOD  MODIFY DATA SET ENTRY IN THE ARCHIVE FILE      DEFAULT
      ARCRECAT RECATALOG ARCHIVED DATA SET FOR AUTO-RECALL   DEFAULT
      ARCRESET RESET DATA SET ENTRY IN THE ARCHIVE FILE      DEFAULT
      BACKAPPL DATA SET APPLICATION BACKUP                  DEFAULT
      BACKUP  ADD BACKUP REQUEST TO REMOTE QUEUE              DEFAULT
s     COPY    COPY DATA SETS                                DEFAULT
      MOVE    MOVE DATA SETS                                DEFAULT
      REMOVEA DELETE ARCHIVE RESTORE REQUEST FROM REMOTE QUEUE DEFAULT
      REMOVEB DELETE BACKUP RESTORE REQUEST FROM REMOTE QUEUE DEFAULT
      REORG   COMPRESS PDS DATA SETS                          DEFAULT
      RESETARC DELETE ARCHIVE REQUEST FROM REMOTE QUEUE      DEFAULT
      RESETBKP DELETE BACKUP REQUEST FROM REMOTE QUEUE      DEFAULT
      RESTAPPL RESTORE DATA SETS FROM APPLICATION BACKUP    DEFAULT
      RESTARC  RESTORE DATA SETS FROM ARCHIVE                DEFAULT
      RESTBKP  RESTORE DATA SETS FROM BACKUP                 DEFAULT

```

This table defines the FDR and ABR commands that can be entered on the report output panels of SRS. On any line enter "S" to view or edit a command, "I" to insert a new command, "R" to copy and edit an existing command, or "D" to delete one. All except "D" take you to another panel, shown below, where you can view or modify the command.

CONTINUED . . .

## 56.41 CONTINUED . . .

Each FDR command consists of a main statement, a data set statement that is repeated for each selected data set, the program name to invoke and how to invoke it. The FDR Function commands are fully customizable. The user may change existing commands and define new commands with different keyword values in the main or data set statements. Keyword values may be automatically extracted from the Data Set List. The FDR Function commands may be saved in a private table library or in a common table library shared between users.

**FDR  
FUNCTION  
COMMAND  
OPTIONS  
(panel 1)**

```
----- FDRSRS - FDR Function Command ----- Panel 1
COMMAND ===>

Command Name ===> COPY           Min number of characters for abbrev ===> 4 (0:8)
Description  ===> COPY DATA SETS

Main Control Statement:
===> COPY TYPE=DSF

Control Statement for Data Set Entry:  (omit DSN= and VOL= operands)
===> SELECT NOTIFY=&USERID

Default action after command is entered:
===> DISPLAY  ( DISPLAY | FG | RQ | SUBMIT | EDIT )

Request type ===> COPY           ( blank or REORG COPY MOVE RESTART RESTBKP RESTAPPL
and/or                                           BACKUP ARCHIVE BACKAPPL)
Program Name ===> FDRCOPY        (FDRABR FDRDSF FDRCOPY FDRABRUT)

Enter ADDISPF in the command line to make this command an ISPF system command.
Enter ADDTSO  in the command line to make this command a TSO command.
```

This example shows the parameters for the COPY command. You can modify them if you like. Press PF3 (END) to save the changes, or PF8 (DOWN) to see additional parameters for the command.

Use the **ADDISPF** and the **ADDTSO** commands to add the FDR function command to the ISPF system command table and as TSO command. This will enable the FDR function commands to be invoked as ISPF system commands or as TSO commands in any panel in any application (including ISPF 3.4).

**FDR  
FUNCTION  
COMMAND  
OPTIONS  
(panel 2)**

```
----- FDRSRS - FDR Function Command ----- Panel 2
COMMAND ===>

Job Statement Information:  (only specify to override default)
===>
===>
===>
===>

SYSOUT Class  ===>

TSO Userid group(s) of authorized users: (YES = all users; NO = no users)
FG ===> YES

BG ===> YES

RQ ===> NO

Recall dataset ===> YES          (yes no)  Suppress VOL= ===>          (yes no)
Setup CLIST    ===>              Cleanup CLIST ===>
Table Panel    ===>              JCL Skeleton  ===>
```

## 56.42 SRS DATA SET SELECTION CRITERIA PANEL

The selection, reporting and sorting criteria for data set selection and the source to be searched are specified in the Data Set Selection Criteria panel. On this panel, you specify the source for information about the data sets to be selected, give the tests that will be used to select those datasets, indicate how the data is to be sorted, and select the information fields that will be included in the display of the selected datasets.

**PANEL A.S.1**  
**SRS DATA SET**  
**SELECTION**

```

----- DATASET SELECTION: DEFAULT ----- LINE 1/181 COL 4:6/10
COMMAND ==>                                SCROLL ==> HALF
ENTER SELECTION CRITERIA
      Read   Save   Submit   Find   Locate   Extract   Options   Help

FIELD      SELECTION VALUE                                REPORT SORT
-----
SOURCE FIELDS
DSNAME     ==> _____
VOL        ==> _____

SOURCE     ==> CATALOG (Catalog Volume Archive Appl Scratch Extract) _____

CATALOGN   ==> _____
ARCDSN     ==> _____
EXTDSN     ==> FDRABR.SRS.EXTRACT_____

VTOC FIELDS
DEFAULTS   ==> _____
UNIT       ==> _____
UNITNAME   ==> _____
DEVTYPE    ==> _____
VOLSQ      ==> _____
DATES       ==> _____

```

The panel shown above is the default, which shows every field available to SRS. Since there are over 100 available fields, the panel is scrollable in 4 directions (UP, DOWN, LEFT, RIGHT). By scrolling UP (PF7/19) and DOWN (PF8/20) you can view all of the fields;. By scrolling LEFT (PF10/22) and RIGHT (PF11/23) you can view a command column on the left, and summary, summary break and field descriptions columns on the right (these are illustrated later).

Many users may never need to do selection on more than a data set name mask and/or volume serial mask. They will never need to use more than the first few fields and need not be concerned about scrolling or the other fields. But the power of SRS is available when they need it.

The **FIELD column** contains the name of a data set attribute (except for the SOURCE FIELDS, which specify the source to be searched). The fields available are essentially the same available for FDREPORT, the ABR Generalized Reporting Program, as described in [Section 56.26](#).

For those fields where the **SELECTION VALUE column** is underlined, you can specify a selection criteria based on that field (other fields are for reporting only and cannot be tested). To select on a given field, enter one or more values (separated by spaces) in the SELECTION VALUE column next to that field (the type of values depend on the nature of the field). Relational operators ( = - = < > <= >= or EQ NE LT GT LE GE ) can be inserted in front of each value (again separated by spaces) and supported in most fields. If a relational operator is not specified, = (equal) is the default.

For a data set to be selected by SRS, it must pass the tests for every Selection Value specified. If multiple Selection Values were specified for the same field, and no relational operators were specified (or they are all = or EQ), the test on that field will pass if it matches ANY of the values. If other relational operators are used, the field must match on ALL of the values.

CONTINUED . . .

## 56.42 CONTINUED . . .

The **REPORT column** indicates which report fields (data set attributes) should be displayed for the selected data sets, allowing you to totally customize the report. An S or a number (representing the order in which the fields are to be displayed) may be specified to select a field to be reported. If no REPORT fields are specified, then the Data Set List will contain the DEFAULTS fields (SPLDSN, VOL, DSORG, RECFM, BLKSIZE, LRECL, SIZE, SIZEFREE, %FREE).

The **SORT column** indicates which fields (data set attributes) should be sorted. This column does not apply when the Source is the ABR SCRATCH Catalog (in which case the Data Set List will be sorted by data set name). Not all fields can be selected for sorting. An S, a number (representing the order in which the fields are to be sorted) or a number followed by an A (for ascending) or a D (for descending) may be specified to select a field to be sorted. If more than one field is specified with an 'S', or if equal numbers are specified, those fields will be sorted in the order in which they appear in the Selection Criteria panel. If both 'S' and numbers are used in the Selection Criteria, then the fields with numbers will be sorted before the fields with 'S'. If no sorting is requested, the data sets will be in the order they were selected from the indicated source.

The **SUMMARY column** indicates which fields should be totaled for the selected data sets. An S or a number (representing the order in which the fields are to be displayed) may be specified to select a field to be summarized.

The **BREAK column** enables the user to select the fields that are to be sub-totaled and summarized in the Data Set List when the field value changes causing a control break. The break column is selected by specifying an "S" or the relative break position number.

A short list of Data Set Selection Criteria commands appears in the fourth line of the panel. These commands provide functions such as READING and SAVING Selection Criteria on disk, FINDING a string, LOCATING a field, SUBMITTING a batch job to process the Selection Criteria, etc. These commands may be entered on the COMMAND line at the top of the screen. However, simply pressing ENTER will execute the data set selection which has been specified on the panel, and will display the Data Set List panel with the data sets selected. A complete list and description of these commands is contained in the SRS HELP tutorials.

CONTINUED . . .

## 56.42 CONTINUED . . .

**PANEL A.S.1  
SCROLLED  
LEFT**

Scrolling LEFT (PF10/22) reveals the CMD column. Line commands such as D, DD (delete), R (repeat), M, MM (move), A (after) and B (before) may be entered to change the display panel.

These line commands can be used to customize which fields are displayed on the Selection panel and what order they are displayed in. This is used when you are developing a data set selection list to be saved for future use. Selection lists with a restricted set of commonly used fields might be saved in an installation-wide library for end-user use.

----- DATASET SELECTION: DEFAULT ----- LINE 1/181 COL 1:5/10									
COMMAND ===>					SCROLL ===> HALF				
	Read	Save	Submit	Find	Locate	Extract	Options	Help	
CMD	FIELD	SELECTION VALUE						REPORT	
----	-----	-----						-----	
_____	SOURCE FIELDS								
_____	DSNAME	====>	_____						_____
_____	VOL	====>	_____						_____
_____	SOURCE	====>	CATALOG (Catalog Volume Archive Appl Scratch Extract)						_____
_____	CATALOGN	====>	_____						
_____	ARCDSN	====>	_____						
_____	EXTDSN	====>	FDRABR.SRS.EXTRACT						
_____	VTOC FIELDS								
_____	DEFAULTS	====>	_____						_____
_____	UNIT	====>	_____						_____
_____	UNITNAME	====>	_____						_____
_____	DEVTYPE	====>	_____						_____
_____	VOLSQ	====>	_____						_____
_____	DATES	====>	_____						_____

CONTINUED . . .



## 56.42 CONTINUED . . .

**PANEL A.S.1** Scrolling RIGHT (PF11/23) reveals the SUMMARY, BREAK, LEN and DESCRIPTION columns.  
**SCROLLED** LEN is the number of bytes that the field value will occupy in the Data Set List. DESCRIPTION is a  
**RIGHT** brief description of the field. For some fields, such as SOURCE, it is necessary to press RIGHT several times to see all of the field DESCRIPTION. A detailed description of all fields is contained in the HELP tutorials.

```

----- DATASET SELECTION: DEFAULT --- LINE 1/181 COL 7:10/10
COMMAND ===>                                SCROLL ===> HALF

      Read   Save   Submit   Find   Locate   Extract   Options   Help

FIELD          SUMM BREAK LEN DESCRIPTION
-----
SOURCE FIELDS
DSNAME  ===>  _____ 27 Data Set Name/VSAM cluster name
VOL      ===>  _____ 6 Volume Serial Data Set resides on

SOURCE  ===>  _____ 7 Source of input data: CATALOG (any or specified b

CATALOGN ===>  _____ 44 Catalog Name where to search (optional)
ARCDSN   ===>  _____ 44 Archive Control File data set name (optional)
EXTDSN   ===>  _____ 54 Data Set Name containing extracted data

VTOC FIELDS
DEFAULTS ===>  _____ 72 Includes: SPLDSN,VOL,DSORG,RECFM,BLKSIZE,LRECL,SI
UNIT      ===>  _____ 3 Device address the dataset is on.
UNITNAME  ===>  _____ 8 Esoteric or generic unit name
DEVTYPE   ===>  _____ 7 Type of Device Data Set resides on
VOLSQ     ===>  _____ 3 Data Set Volume Sequence Number
DATES      ===>  _____ 20 Includes: CRDATE,EXPDATE,LRDATE

```

The default source to be searched is the CATALOG. Based on DSNAME, VOL and CATALOGN, data sets will be selected from the system catalogs, then the volsers indicated in the catalog will be accessed to extract additional fields relating to the data sets; if selection values for other fields were specified, the selected data sets will be filtered to eliminate those which do not match. The remaining datasets will be displayed with the requested (or default) report fields. If only DSNAME, VOL, and/or CATALOGN were selected on, you will have to press RIGHT (PF11/23) to view the other requested report fields.

For instance, to list all cataloged data sets starting with DF, either specify the high level index DF (which will automatically be converted into a data set filter), or the data set filter DF.\*\* in the Selection Value column in the DSNAME row and press the ENTER key. The catalogs are searched and a Data Set List is displayed.

CONTINUED . . .

## 56.42 CONTINUED . . .

**PANEL A.S.1**  
**SIMPLE**  
**CATALOG**  
**EXAMPLE**

```

----- DATASET SELECTION: DEFAULT ----- LINE 1/181 COL 4:6/10
COMMAND ==>                                SCROLL ==> HALF

      Read   Save   Submit   Find   Locate   Extract   Options   Help

FIELD      SELECTION VALUE                                REPORT SORT
-----
SOURCE FIELDS
DSNAME  ==> DF.**
VOL      ==>

SOURCE   ==> CATALOG (Catalog Volume Archive Appl Scratch Extract)

CATALOGN ==>
ARCDSN   ==>
EXTDSN   ==> FDRABR.SRS.EXTRACT

VTOC FIELDS
DEFAULTS ==>
UNIT      ==>
UNITNAME  ==>
DEVTYPE   ==>
VOLSQ     ==>
DATES      ==>

```

The data set name is automatically converted into a data set filter, unless it is imbedded in apostrophes, or already is a data set filter. The data set name filter uses the XDSN syntax of FDREPORT, documented earlier in this section. In simplest form, alphanumeric characters and periods represent themselves, \* (one asterisk) represents any number of characters within a single index level, and \*\* (two asterisks) represent any number of characters in any number of index levels. Other special characters (such as + for any single numeric) are available.

Other sources are:

- VOLUME**      the data sets will be selected directly from the VTOCs of the indicated volumes; specify \* on the VOL line to search all online volumes.
- ARCHIVE**     ARCHIVED data sets will be selected from an ARCHIVE Control File. By default, the common ACF indicated in the FDR/ABR Option table will be used, but any ACF can be specified by ARCDSN.
- APPL**         Application Backup data sets will be selected from the Control File. By default, the common ACF indicated in the FDR/ABR Option table will be used, but any Control file ([See Section 52.08](#)) can be specified by ARCDSN.
- SCRATCH**     selects from the ABR scratch catalog.
- EXTRACT**     reads an extract file produced by FDREPORT (see RPTYPE=DATA earlier in this section)

## 56.43 SRS DATA SET LIST PANEL

The SRS Data Set List Panel will be displayed when data sets are selected from a Data Set Selection panel, or when a saved Data set list is selected from the SRS primary panel. The format depends on the report fields selected on the original selection panel. If the selected report fields will not fit on one screen, you can scroll LEFT and RIGHT to view it all. If the selected data sets will not all fit on one screen, you can scroll UP and DOWN.

The following Data Set List Panel was displayed after a catalog search using the data set name filter DF.\* as shown in the example in the previous section. The default report fields are shown.

**PANEL A.S.2  
DATA SET LIST**

----- DATASET LIST: DSLIST ----- LINE 1/136 COL 3:9/10									
COMMAND ==>					SCROLL ==> HALF				
109 DATA SETS SELECTED.									
	Read	Save	Find	Locate	Refresh	Next	Message	Printd	Help
COMMAND	DATA SET NAME				VOLSER	DSO	RECFM	BKSIZ	LRECL ALLOC FREE
-----									
	DF.\$IAM.CLUSTER				SMS812	*NO VOLUME DATA			
					*	*NO VOLUME DATA			
	DF.ABRMAP				MIGRAT	ARCHIVED			
copy	DF.APF.LOAD				IDPLB1	PO	U	32760	146 52
copy	DF.ARCHIVE				IDPLB0	DA	F	23392	1 0
	DF.ASM.SOURCE				IDPLB1	PO	FB	19040	80 330 52
	DF.BROCHURE				MIGRAT	ARCHIVED			
	DF.CALL.LOG				IDPLB1	PO	FB	6192	72 9 6
	DF.CAN				SCR083	*NO VOLUME DATA			
					*	*NO VOLUME DATA			
	DF.CMD.CLIST				IDPLB1	PO	FB	6240	80 60 18
	DF.CPK.REPORT				MIGRAT	ARCHIVED			
	DF.CPK2.REPORT				MIGRAT	ARCHIVED			
	DF.CSVLLA				IDPLB1	PO	FB	3360	80 1 0
	DF.DATA				IDPLB1	PO	FB	6240	80 15 0
	DF.DFP23.DOC				MIGRAT	ARCHIVED			

Since the Data Set List column headers may be different from the selection field names (to occupy fewer columns). Column description may be obtained by positioning the cursor at the column and pressing the HELP key, or by entering the VIEW primary command.

Archived data sets are marked as ARCHIVED, and data sets not found on their cataloged volumes are marked as \*NO VOLUME DATA. Unwanted data set entries in the Data Set List may be excluded from the display by entering the X or XX line commands in the COMMAND field. The Data Set List can be saved for redisplay at any time with option 2 on the SRS primary menu, and can be REFRESHed by regathering the report fields at any time.

Various services can be invoked by the user for one or more of the data sets displayed:

- SRS services (such as I (info), M (member list))
- FDR/ABR functions (such as Recall, Reorg, Copy)
- ISPF services (such as Edit, Browse)
- TSO commands (such as DELETE, LISTDS, LISTCAT, RENAME)
- CLISTs and REXX execs

by entering the command name in the COMMAND column next to the data set to be processed. Most commands need nothing more than the data set name, but some TSO commands and CLIST/REXX execs may need the data set name passed in a special way. If so, specify the complete command, with all operands, substituting a slash (/) where SRS is to substitute the data set name in apostrophes (You can type over the dsname on the panel; SRS will remember it). For example,

LISTCAT ENTRY(/) ALL

CONTINUED . . .

**56.43 CONTINUED . . .**

When you enter the name of a FDR/ABR service (such as COPY), operands valid for the service may also be included in the command. Action strings may also be included in the command, as follows:

- DISPLAY – display a table for additional operands and execution
- FG – execute the Service in the foreground (under TSO)
- RQ – add request to the ABR remote queue immediately
- SUBMIT – submit the generated JCL immediately
- EDIT – edit the generated JCL

For instance, to copy a data set to another name in the foreground, specify

`COPY / NEWINDEX=++XYZ FG`

To perform the same function or service with the same operands on another data set further down in the Data Set List, enter the = (equal sign) repeat row command next to that data set.

Once a command is executed, it is displayed in the row COMMAND field preceded by an indicator representing the return code from the command: \* (asterisk) for return code 0, ¬ (not-sign) for return code 4, or ? (question mark) for all other return codes.

You can also specify a command to apply to *all* data sets displayed by entering it on the COMMAND line at the top of the screen. It *must* include a slash (/).

Data Set List commands, such as SAVE, READ, REFRESH, FIND, PRINTD, etc. may also be specified in the COMMAND line at the top of the screen. Please refer to the SRS HELP tutorial for a complete list and detailed description of the Data Set List commands.

The PRINTD (abbreviated P) command allows you to generate a printed report from the information in the Data Set List. A prompting panel will allow you to print all of the fields displayed, or to customize the report.

**56.44 SRS DATA SET LIST FDR/ABR FUNCTIONS**

The FDR/ABR functions supported on the Data Set List panel each have options that can be customized on the SRS option panels, as shown in [Section 56.41](#). When you enter a FDR/ABR function name, you may be prompted to override those defaults. For example, for a COPY function:

```
----- FDRSRS - Copy Data Set ----- ROW 1 TO 2 OF 2
COMMAND ==>                                SCROLL ==> HALF

      Edit generated JCL      Submit generated JCL      FG - execute in the foreground

Operands for COPY TYPE=DSF statement (section 21):
==> COPY TYPE=DSF

FROM DSNAME / Filter ==> 'DF.APF.LOAD'
      Volume Serial    ==> IDPLB1
TO   New DSNAME       ==> 'df.apf.load2'
      or NEWINDEX      ==>
New Volume Serial(s) ==>
Operands for SELECT DSN= statement (section 21):
==> NOTIFY=DF

FROM DSNAME / Filter ==> 'DF.ARCHIVE'
      Volume Serial    ==> IDPLB0
TO   New DSNAME       ==>
      or NEWINDEX      ==> ++copy2
New Volume Serial(s) ==>
Operands for SELECT DSN= statement (section 21):
==> NOTIFY=DF
```

The defaults for each FDR/ABR function can be modified using **option 0** on the SRS Primary Menu, or the FUNCTION (FF or FS) command can be used on the COMMAND line of the Data Set List panel. For convenience, you can go directly to the options panel for a particular function, for instance: FF COPY

## 56.45 SRS VOLUME SELECTION CRITERIA PANEL

The selection, reporting and sorting criteria for volume selection are specified in the Volume Selection Criteria panel. On this panel, you give the tests that will be used to select volumes, indicate how the volume data is to be sorted, and select the information fields that will be included in the display of the selected volumes.

**PANEL A.S.3  
VOLUME  
SELECTION  
CRITERIA**

----- VOLUME SELECTION: DEFAULT ----- LINE 1/61 COL 4:6/10		SCROLL ==> HALF	
COMMAND ==>			
ENTER SELECTION CRITERIA			
Read   Save   Submit   Find   Locate   Extract   Options   Help			
FIELD	SELECTION VALUE	REPORT	SORT
-----	-----	-----	-----
VLVOLSER ==>	PROD*_____	_____	_____
VLUNIT ==>	_____	_____	_____
UNITNAME ==>	_____	_____	_____
VLDEVTYPE ==>	_____	_____	_____
STORGRP ==>	_____	_____	_____
VL%FTRKS ==>	_____	_____	_____
VL%UTRKS ==>	_____	_____	_____
VL%FDSCB ==>	_____	_____	_____
VL%UDSCB ==>	_____	_____	_____
VL%FINDX ==>	_____	_____	_____
VL%UINDX ==>	_____	_____	_____
VL%FVDS ==>	_____	_____	_____
VL%UVDS ==>	_____	_____	_____
VLALOTRK ==>	_____	_____	_____
VLAVGTRK ==>	_____	_____	_____
VLALOSTA ==>	_____	_____	_____

The Volume Selection Criteria Panel functions in a similar fashion to the Data Set Selection Criteria Panel documented in the preceding sections. There are more fields which can be viewed by scrolling UP and DOWN. The command field and field descriptions can be viewed by scrolling LEFT and RIGHT. Selection, reporting, summary and sorting criteria are specified just like the Data Set Selection Criteria.

Volume selection differs from data set selection in that one line of the generated volume list contains fields relating to one whole DASD volume. There is no SOURCE field since there is no choice of source with volume selection; information is gathered from the VTOC, VTOCIX, and VVDS of the volumes selected, and the LSPACE SVC.

## 56.46 SRS VOLUME LIST PANEL

The following Volume List was generated by specifying PROD\* in the VLVOLSER field in the Volume Selection Criteria. The volume list shown is the default if no report fields are selected.

**PANEL A.S.4  
VOLUME LIST**

----- VOLUME LIST: VOLLIST ----- LINE 1/13 COL 3:12/14											
COMMAND ==>						SCROLL ==> HALF					
13 VOLUMES SELECTED.											
	Read	Save	Find	Locate	Refresh	Next	Message	Printd	Help		
COMMAND	VOLSER	DEVTYPE	UADR	VTINDX	USEATTR	USERS	ALOTR	%TU	FRTRK	LFCYL	LFTRK
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
	PRODM1	3380	0140	ACTIVE	PRIVATE	0	11979	91	1296	41	640
	PRODB0	3380	0141	ACTIVE	PRIVATE	19	11083	84	2192	144	2160
	PRODK1	3380	0146	ACTIVE	PUBLIC	0	2612	20	10663	684	10273
	PRODB3	3380	0147	ACTIVE	PRIVATE	62	12235	93	1040	34	526
	PRODB2	3380	0149	ACTIVE	PRIVATE	42	11934	90	1341	78	1170
	PRODB1	3380-K	0151	ACTIVE	STORAGE	205	37238	94	2587	58	884
	PRODB5	3380-K	0152	YES	STORAGE	309	33202	84	6623	198	2970
	PRODB4	3380-K	0154	ACTIVE	STORAGE	195	35433	89	4392	287	4310
	PRODM3	3380-K	0156	ACTIVE	PRIVATE	13	27678	70	12147	807	12118
	PRODM0	3380	0183	ACTIVE	PRIVATE	198	13129	99	146	9	142
	PRODK0	3380	0184	ACTIVE	STORAGE	1	6951	53	6324	317	4758
	PRODK2	3380	0186	ACTIVE	STORAGE	3	7591	58	5684	190	2864
	PRODM2	3380	0188	ACTIVE	PRIVATE	76	13118	99	157	1	15

Since the Volume List column headers may be different from the selection field names (to occupy fewer columns), column descriptions may be obtained by positioning the cursor at the column and pressing the HELP key, or by entering the VIEW primary command.

Since the volume column headings may not be immediately obvious, here is what some of them mean (the last 2 are not shown on the panel above since you must scroll right to see them:

ALOTR – total allocated tracks on the volume

%TU – percentage of tracks allocated

FRTRK – total free tracks on volume

LFCYL – largest free cylinder extent on the volume

LFTRK – largest free track extent on the volume

FREXT – number of free extents on the volume

FRAG – IBM fragmentation index for the volume

You may enter a **S** in the command column to display the SRS data set list for all the data sets on the selected volume.

## 56.47 SRS ISPF FASTPATHS AND COMMANDS

**ISPF FASTPATHS** Once you have become familiar with using SRS, you can use these ISPF "fastpath" options from the ISPF main menu to invoke SRS without going through the intermediate panels:

**A.S.** – executes the DEFAULT Data Set Selection Criteria and selects data sets matching your TSO prefix or TSO userid.

**A.S.dsmask** – executes the DEFAULT Data Set Selection Criteria, and selects the data sets matching the data set name mask specified. The mask can be any type of mask supported by the XDSN= operand of FDREPORT as documented earlier in this section. If the mask is not in quotes, SRS will assume that it is a prefix and append ".\*\*" to the end. For fully-qualified names, place them in single quotes. For example:

A.S.TSO1

A.S.'TSO1.JCL.CNTL'

A.S.'TSO+.\*.CNTL'

**A.S.selname,dsmask** – same as the previous fastpath except that the Data Set Selection Criteria saved under name "selname" will be used. For example:

A.S.ABRBKUP,TSO1

In all of the preceding A.S fastpaths, you may optionally follow them with a backslash and a volume serial or volume prefix to limit the display to those volumes. For example:

A.S.TSO1\PUB\*

A.S.ABRBKUP,PROD.PAYROLL\PAY123

A.S..WORK\*

**A.S1** – displays the most recently used saved Data Set Selection Criteria, allowing you to modify and execute it.

**A.S1.selname** – displays the named saved Data Set Selection Criteria. For example,  
A.S1.ABRBKUP

**A.S2** – displays the most recently used saved Data Set List.

**A.S2.listname** – displays the named Data Set List.

**A.S3** – displays the most recently used Volume Selection Criteria list.

**A.S3.volser** – executes the most recently used Volume Selection Criteria list against the volume serial or volser prefix specified. For example,

A.S3.TSO123

A.S3.TSO1\*

**A.S3.selname**, – displays the named Volume Selection Criteria list.

**A.S3.selname,volser** – executes the named Volume Selection Criteria list against the volume serial or volser prefix specified.

**A.S4** – displays the most recently used saved Volume List.

**A.S4.listname** – displays the named saved Volume List.

Since ISPF will also allow you to stack ISPF commands on one line, separated by a semicolon (by default), when the ISPF fastpath results in a data set or volume list being displayed, you can also specify a command to be executed against all of the displayed data sets or volumes. For example:

**A.S.PDS,USER1;REORG / FG** – assuming that PDS is a saved selection criteria that selects only PDSs, this will execute a reorganization (PDS compression) against every PDS belonging to USER1.

CONTINUED . . .



## 56.47 CONTINUED . . .

**ISPF COMMANDS** To invoke SRS or an FDR function as a primary ISPF command from any panel in any ISPF application, invoke the FDRCMDS CLIST on ISPF option 6 (TSO Command Processor) to add SRS invocation commands and the default FDR Function commands to the ISPF system command table, as follows:

```
EXEC 'IDP.DIALOG.CLIST(FDRCMDS)'
```

New FDR Function commands created by the user may also be added to the ISPF system command table and to the CLIST library, allowing the command to be invoked as a primary ISPF command, and as a TSO command (see ADDISPF and ADDTSO commands in [Section 56.41](#)).

Once the ISPF system command table is updated, you may invoke SRS or an FDR function from any panel in any ISPF application, as shown in these examples:

**SRS *dsmask*** – executes the DEFAULT Data Set Selection Criteria and selects the data sets the specified mask.

**REORG '*dsname*'** – performs the REORG function to the specified dsname.

**RETBKP '*dsname*' NEWINDEX(++REST)** – restores from backup the specified dsname into a new dsname.

**S2 *listname*** – displays the named saved Data Set List (or the last name used if *listname* is omitted).

**S2 *listname*;REORG / FG** – reads the named saved Data Set List and performs the REORG function to all data set entries in the TSO foreground.

## 56.48 SRS EXAMPLES

This section "walks" you through several examples showing the ease of use and power of SRS for several common functions. The display at each step in each example is shown; data in *italics* was entered on that panel by the user.

**RESTORE  
FROM  
ARCHIVE**

A user wishes to display all of his ARCHIVED data sets and select several for restore. From the SRS main menu, option 1 (select data sets) with the default selection criteria was chosen:

```

----- FDRSRS - Primary Menu -----
OPTION ==> 1

  0  OPTIONS  - Set Dialog Options and Defaults

  1  SELECT   - Select Data Sets
              Selection Name ==> DEFAULT      ( * = display member list )

  2  DSLIST   - Display Saved Data Set List
              List Name       ==> *          ( * = display member list )

  3  SELVOL   - Select Volumes
              Selection Name ==> DEFAULT      ( * = display member list )

  4  VOLLIST  - Display Saved Volume List
              List Name       ==> *          ( * = display member list )

```

On the selection panel, a data set prefix is entered, and the source is changed to ARCHIVE. If you need to report on a special ARCHIVE Control File or a Control File used for Application Backup, you can enter the control file name under ARCDNS; if left blank, the ARCHIVE control file used for auto-recall (from the FDR Global Option Table) is automatically used. Since no reporting criteria are specified, the default report is displayed.

```

----- DATASET SELECTION: DEFAULT ----- LINE 1/181 COL 4:6/10
COMMAND ==>                                SCROLL ==> HALF
ENTER SELECTION CRITERIA
      Read  Save  Submit  Find  Locate  Extract  Options  Help

FIELD          SELECTION VALUE                                REPORT SORT
-----
SOURCE FIELDS
DSNAME  ==> qrp.**_____
VOL      ==> _____

SOURCE  ==> archive (Catalog Volume Archive Appl Scratch Extract) _____

CATALOGN ==> _____
ARCDNS   ==> _____
EXTDSN   ==> _____

VTOC FIELDS
DEFAULTS ==> _____
UNIT      ==> _____
UNITNAME  ==> _____
DEVTYPE   ==> _____
VOLSQ     ==> _____
DATES      ==> _____
CRDATE    ==> _____
CRDAYS     ==> _____

```

CONTINUED...

A list of ARCHIVED data sets that match the name mask are displayed with their characteristics. The list can be scrolled up and down to see all the data sets, and left and right to see all of the fields that SRS displays by default. If you want to restore any of them, simply type "restore" next to them.

----- DATASET LIST: DSLIST ----- LINE 73/420 COL 3:9/13											
COMMAND ===>					SCROLL ===> HALF						
420 DATA SETS SELECTED.											
	Read	Save	Find	Locate	Refresh	Next	Message	Printd	Help		
COMMAND	ENTRY NAME				VOLSER	DSO	RECFM	BKSIZ	LRECL	ALLOC	FREE
-----											
restore	QRP.FLOR.INFO				IDPLB3	PS	FB	3120	80	2	0
	RP.DEFRAG.TXT				IDPLB4	PS	FB	9040	80	1	0
	RP.IAM.THIRD				IDPLB3	PS	FB	3120	80	5	0
restore	RP.V2R3.TABLES				IDPLB4	PO	FB	6160	80	1	0
	RP.JCL.CNTL				IDPLB3	PO	FB	3120	80	90	19
	RP.DASD.D33909				IDPLB1	PS	FBA	8000	80	1	0

The "restore" command displays a panel where options for the restore, such as new name or new volser, can be specified for each of the selected data sets. If more data sets were selected than can fit on the screen, the list is scrollable. Enter a command on the command list to submit the restore as a batch job (or edit the JCL before submission), execute the restore immediately under TSO, or add it to the ABR remote queue for later processing.

```

----- FDRSRS - Archive Restore ----- Row 1 to 2 of 2
COMMAND ==> submit                                SCROLL ==> HALF

    Edit JCL    Submit JCL    FG - execute in the foreground    RQ - add to remote q

Operands for RESTORE TYPE=ARC statement (section 51.06):
==> RESTORE TYPE=ARC,DT,DYNARC

DSNAME / Filter ==> 'QRP.DEFRAG.TXT'
Volume Serial    ==> IDPLB4                                Archive date ==>
New DSNAME       ==>
or NEWINDEX      ==> .defrag2
New Volser(s)    ==>                                        Copy ==>
Operands for SELECT DSN= statement (section 51):
==> NOTIFY=BAB

DSNAME / Filter ==> 'QRP.JCL.CNTL'
Volume Serial    ==> IDPLB3                                Archive date ==>
New DSNAME       ==>
or NEWINDEX      ==>
New Volser(s)    ==> tsowk*                                Copy ==>
Operands for SELECT DSN= statement (section 51):
==> NOTIFY=BAB

```

## 56.48 CONTINUED . . .

**RESTORE  
FROM BACKUP**

A user needs to restore several of his data sets from ABR backups. From the SRS main menu, option 1 (select data sets) was chosen and a selection name of "\*" is specified to list all available saved selection lists:

```
----- FDRSRS - Primary Menu -----
OPTION ==> 1

  0  OPTIONS  - Set Dialog Options and Defaults

  1  SELECT   - Select Data Sets
              Selection Name ==> *           ( * = display member list )

  2  DSLIST   - Display Saved Data Set List
              List Name      ==> *           ( * = display member list )

  3  SELVOL   - Select Volumes
              Selection Name ==> DEFAULT     ( * = display member list )

  4  VOLLIST  - Display Saved Volume List
              List Name      ==> *           ( * = display member list )
```

```
----- FDRSRS - Selection Criteria List - Row 1 to 15 of 15
Command ==>                               Scroll ==> HALF

Place an "S" to select the Selection Criteria to process, or "D" to delete.

Sel Member  Description                                     Date
-----
s  ABRBKUP   abr backup info                               96.163
    AJMARC   display archive data sets for ajm             92.119
    ARCBKUP  archive backup info                             96.163
    ARCEF    archived icf datasets                          92.294
    DEFAULT  BUILT-IN SELECTION CRITERIA - CONTAINS ALL FIELDS  V5.2/DF
    DF       df data sets----- 92.064
    DFARC    DF application backups                        92.119
    ICF      92.119
    LLSOLDB  full oldbkup information                       96.159
    LLSSDS   output comparable to showds command          92.275
    NE       not equal                                     95.279
    REPALL   all report fields                             92.119
    SPACE    92.294
    SPACE2   sizeinfo, dates, dcbinfo, ctfld              92.192
    TJM      92.119
```

The list of saved selection and reporting criteria is displayed. Depending on the SRS options set, these saved criteria might have been previously created by the user, or might be criteria available to all SRS users, or both. The ABRBKUP list is selected, since it will display all information about the ABR backups of selected data sets:

CONTINUED . . .

## 56.48 CONTINUED . . .

The selection panel is now displayed, preset with the selection and reporting criteria from the ABRBKUP list. In this case, ABRBKUP simply defines a report format, so only REPORT fields are pre-specified; the numbers shown in the REPORT column is the order that those fields will be displayed on the screen. The list has been customized so that only the selected report fields are displayed. Several data set name masks are entered to display backup info about those data sets.

```

----- DATASET SELECTION: ABRBKUP ----- LINE 1/16 COL 4:6/10
COMMAND ==>
                                SCROLL ==> HALF
ENTER SELECTION CRITERIA
      Read   Save   Submit   Find   Locate   Extract   Options   Help

FIELD      SELECTION VALUE                                     REPORT SORT
-----
DSNAME     ==> bab.*.jcl  bab.ac**_____ 1_____
VOL        ==> _____ 2_____

SOURCE     ==> CATALOG (Catalog Volume Archive Appl Scratch Extract) _____
CATALOGN   ==> _____

DEVTYPE    ==> _____ 3_____
DSORG      ==> _____ 4_____
BKGEN      ==> _____ 6_____
BKCYCLE    ==> _____ 7_____
BKINFO     ==> _____ 8_____
OLDBKUP    ==> ALL_____
SIZE       ==> _____ 5_____

```

A list of the selected data sets is displayed, along with backup information for each. For those that have more than one backup recorded (the OLDBACKUP option), *all* of the recorded backups are displayed, including the date that each backup was taken. Since this selected data sets from the system catalogs, archived data sets may also be selected, as shown. To restore a data set from backup, simply type "restore" on the line for the backup desired:

```

----- DATASET LIST: DSLIST ----- LINE 1/20 COL 3:9/12
COMMAND ==>
                                SCROLL ==> HALF
3 DATA SETS SELECTED.
      Read   Save   Find   Locate   Refresh   Next   Message   Printd   Help

COMMAND  DATA SET NAME                                     VOLSER DEVTYPE ALLOC DSO BKGN BKC BKDATE
-----
          BAB.HCHECKV2.CNTL                                IDPLB0 ARCHIVED
          BAB.JCL.CNTL                                     TSOWK0 3380      150 PO  230  1 96.162
                                                    230  0 96.159
                                                    229  4 96.158
                                                    229  2 96.156
                                                    229  1 96.155
                                                    229  0 96.152
restore   _____                                     _____
                                                    228  3 96.151
                                                    228  2 96.150
                                                    228  1 96.149
                                                    228  0 96.145
                                                    227  3 96.143
                                                    227  2 96.142
                                                    227  0 96.138
                                                    226  4 96.137
restore   BAB.AC.DATA                                     IDPLB3 3380-K      1 PS  721  0 96.159

```

CONTINUED . . .

## 56.48 CONTINUED . . .

The "restore" command displays a panel where options for the restore, such as new name or new volser, can be specified for each of the selected data sets. Note that the correct volume, gen and cycle to restore the backup selected are already filled in. If more data sets were selected than can fit on the screen, the list is scrollable. Enter a command on the command list to submit the restore as a batch job (or edit the JCL before submission), execute the restore immediately under TSO, or add it to the ABR remote queue for later processing.

```

----- FDRSRS - Backup Restore ----- Row 1 to 2 of 2
COMMAND ==> edit                                SCROLL ==> HALF

    Edit JCL    Submit JCL    FG - execute in the foreground    RQ - add to remote q

Operands for RESTORE TYPE=ABR statement (section 50):
==> RESTORE TYPE=ABR,DT

DSNAME/Filter ==> 'BAB.JCL.CNTL'                    Gen ==> 0228
Volume Serial ==> TSOWK0                            Cycle => 03
New DSNAME      ==>                                OLDB  =>
or NEWINDEX     ==>                                Copy  => 1
New Volser(s)   ==>
Operands for SELECT DSN= statement (section 50):
==> NOTIFY=BAB

DSNAME/Filter ==> 'BAB.AC.DATA'                      Gen ==> 0721
Volume Serial ==> IDPLB3                            Cycle => 00
New DSNAME      ==>                                OLDB  =>
or NEWINDEX     ==>                                Copy  => 1
New Volser(s)   ==>
Operands for SELECT DSN= statement (section 50):
==> NOTIFY=BAB

```

CONTINUED . . .

## 56.48 CONTINUED . . .

**VOLUME REPORTS** A Storage Analysis wants to monitor usage and free space on production and data base volumes.  
From the SRS main menu, option 3 (select volumes) with the default selection criteria was chosen:

```

----- FDRSRS - Primary Menu -----
OPTION  ==> 3

  0  OPTIONS  - Set Dialog Options and Defaults

  1  SELECT   - Select Data Sets
           Selection Name ==> DEFAULT      ( * = display member list )

  2  DSLIST   - Display Saved Data Set List
           List Name      ==> *           ( * = display member list )

  3  SELVOL   - Select Volumes
           Selection Name ==> DEFAULT      ( * = display member list )

  4  VOLLIST  - Display Saved Volume List
           List Name      ==> *           ( * = display member list )

```

On the selection panel, volume serial prefixes are entered. Since no reporting criteria are specified, the default report is displayed.

```

----- VOLUME SELECTION: DEFAULT ----- LINE 1/72 COL 4:6/10
COMMAND ==>                                SCROLL ==> HALF
ENTER SELECTION CRITERIA
      Read   Save   Submit   Find   Locate   Extract   Options   Help

FIELD      SELECTION VALUE                                REPORT SORT
-----
VLVOLSER ==> PROD* DBLG*                                _____
VLUNIT  ==> _____                                _____
UNITNAME ==> _____                                _____
VLDEVTYP ==> _____                                _____
STORGRP  ==> _____                                _____

VL%FTRKS ==> _____                                _____
VL%UTRKS ==> _____                                _____
VL%FDSCB ==> _____                                _____
VL%UDSCB ==> _____                                _____
VL%FINDX ==> _____                                _____
VL%UINDX ==> _____                                _____
VL%FVVDS ==> _____                                _____
VL%UVVDS ==> _____                                _____
VLALOTRK ==> _____                                _____

```

CONTINUED . . .

## 56.48 CONTINUED . . .

The status of the selected volumes is displayed, including Indexed VTOC status, mount status, tracks allocated, percentage used, and free space information. If you scroll right, the number of free extents and the IBM fragmentation index for each volume is visible.

----- VOLUME LIST: VOLLIST ----- LINE 1/7 COL 3:12/14											
COMMAND ==>						SCROLL ==> HALF					
7 VOLUMES SELECTED.											
	Read	Save	Find	Locate	Refresh	Next	Message	Printd	Help		
COMMAND	VOLSER	DEVTYPE	UADR	VTINDX	USEATTR	USERS	ALOTR	%TU	FRTRK	LFCYL	LFTRK
-----	-----	-----	-----	-----	-----	-----	-----	---	-----	-----	-----
	DBLG01	3380	0143	ACTIVE	STORAGE	115	2934	23	10341	438	6573
	PROD01	3380-K	0151	ACTIVE	STORAGE	238	34027	86	5798	187	2811
	PROD05	3380-K	0152	ACTIVE	STORAGE	448	38726	98	1099	28	420
	PROD04	3380-K	0154	ACTIVE	STORAGE	251	37238	94	2587	82	1230
	PROD03	3380-K	0155	ACTIVE	PRIVATE	83	35703	90	4122	180	2700
	DBLG00	3390-3	0180	ACTIVE	STORAGE	129	46340	93	3745	53	801
	PROD00	3390-3	0183	ACTIVE	PRIVATE	12	49705	99	380	24	360

CONTINUED . . .



## 56.48 CONTINUED . . .

**FASTPATH  
VOLUME  
DISPLAY**

Operations wants to regularly check on the free space available on various volumes, to anticipate and avoid allocation problems. Previously, a SRS volume report was customized and saved as FREESPC, as shown here. It displays the percentage of free space on the volume and in the VTOC as well as total free tracks on each volume. It only selects volumes which have less than 20% free space.

```

----- VOLUME SELECTION: DEFAULT ----- LINE 1/7 COL 4:6/10
COMMAND ==> save freespc                                SCROLL ==> HALF
ENTER SELECTION CRITERIA
      Read   Save   Submit   Find   Locate   Extract   Options   Help

FIELD          SELECTION VALUE                                REPORT SORT
-----
VLVOLSER ==> _____ S_____
VLUNIT  ==> _____ S_____
VLDEVTYPE ==> _____ S_____

VL%FTRKS ==> <20_____ S_____
VL%FDSCB ==> _____ S_____
VLFRETRK ==> _____ S_____

```

Once this is saved, the operators can request the report from the ISPF main menu, specifying the volume serial or volser prefix to be displayed:

```

-----
Ispf 4.2 Primary Option Menu
OPTION ==> a.s3.freespc,sys*                                Scroll => PAGE
User ID - BAB      Date   - 96/06/12 System - MVS/ESA  Proc   - V42ISPF
Prefix - BAB      Julian - 96.164  SP Lvl - SP5.2.2  Applid - ISR
PF Keys - 24      Time    - 12:16  PUT Lvl - PDO-9547 Nest Lvl- 1
                  CPU     - 9121-B  DFP Lvl - DFSMS1.3 CPU Type- DEVELP
                                      More:      +
-----
| Std options | Variable Options |
|-----|
| 0 Settings | A1 ABR - levels | User ID . : BAB
| 1 View     | A2 AMBLIST      | Time. . . : 12:16
| 2 Edit     | A3 APFLIST displ | Terminal. : 3278
| 3 Utilities| B1 Blksize Optim | Screen. . : 3
| 4 Foreground| C1 Colors 3279-3 | Language. : ENGLISH
| 5 Batch     | C9 Call Log      | Appl ID . : ISR
| 6 TSO Cmds  | D3 Dataset Table | TSO logon : V42ISPF
|-----|

```

and receive a report such as:

```

----- VOLUME LIST: VOLLIST ----- LINE 1/3 COL 3:7/7
COMMAND ==>
3 VOLUMES SELECTED.
      Read   Save   Find   Locate   Refresh   Next   Message   Printd   Help

COMMAND  VOLSER UADR DEVTYPE %TF %DF FRTRK
-----
          SYSLB4 016B 3390-2   19  36  6424
          SYSOS1 016C 3390-2   16  37  5469
          SYSLB3 016E 3390-2    9  63  3116

```

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**80.01 INTRODUCTION**

This section describes the various printer, console and TSO messages which may be output by INNOVATION's FAST DUMP RESTORE system and the various ABEND codes with which it may terminate.

**FDR/ABR  
MESSAGES  
FORMAT**

The general format of FDR messages and WTORs is as follows:

FDRnnn                      Message-text.

or

FDRnnn\*\*                      Message-text.

When \*\* appears the message is an error message. The step will ABEND, or will pass a return code of 8 or higher unless indicated otherwise in the specific message.

**CPK  
MESSAGES  
FORMAT**

The general format of COMPAKTOR messages is as follows:

                                 I  
                                 A  
CPKnnn                      W      Message-text.  
                                 E

Where nnn is a 3-digit number. Following this number is a message type code:

I – Informative message.

A – Action required message.

W – Warning message. May result in abnormal termination.

E – Error message. Always results in abnormal termination.

**RETURN  
CODES**

FDR passes a return code at the end of the step, unless it ABENDs. A return code of zero indicates that FDR has performed all functions successfully. A return code of 4 indicates that the testing period for the product has expired. Any other return code indicates that errors of some kind have occurred during this execution of FDR. Check the listing for the error messages.

**ABEND  
CODES**

FDR ABEND codes range from a U0100 to a U0900. Most user ABENDs are preceded by an FDR message.

**WAIT STATE  
CODES**

The Stand Alone Restore (SAR) program may put the CPU in a WAIT STATE with a meaningful code in the instruction address field of the PSW (last 4 digits).

**FDRREORG  
MESSAGE  
FORMAT**

The general format of FDRREORG messages is as follows:

FDRRnn

FDRSnn

If \* appears after the message this is a Warning Message.

If \*\* appears after the message this is an Error Message.

**80.02 FDR WTO/WTOR CONSOLE MESSAGES AND TSO TERMINAL MESSAGES**

The following write-to-operator, write-to-operator-with-reply and TSO messages are issued by FDR:

**FDRW01 CONFIRM REQUEST TO RESTORE UNIT=uuu,VOL=vvvvvv,JOB=jjjjjj**

**Reason:** The job indicated in the message wishes to restore the entire volume specified.  
**Action:** Reply YES—Operator approves request to restore.  
 Reply NO—Operator cancels the restore request.

**FDRW02 CONFIRM REQUEST TO ABSOLUTE TRACK RESTORE UNIT=uuu, VOL=vvvvvv, JOB=jjjjjj**

**Reason:** The job indicated in the message wishes to do an absolute track restore of the volume specified.  
**Action:** Reply YES—Operator approves request to restore.  
 Reply NO—Operator cancels the restore request.

**FDRW03 dsname DATE PROTECTED—REPLY YES OR NO TO RESTORE VOL=vvvvvv**

**Reason:** A data set restore has been requested for this data set. The allocated data set on the receiving volume has been date protected by use of the expiration date field and the expiration date has not been reached. If you wish to suppress this message, specify EXPD=NONE on the RESTORE TYPE=DSF/ABR/ARC command.  
**Action:** Reply YES—Operator approves request to restore.  
 Reply NO—Operator cancels the restore request for this data set.

**FDRW04 FULL VOLUME RESTORE COMPLETED—UNIT=uuu SHOULD BE REMOUNTED ON OTHER SYSTEMS**

**Reason:** A full volume restore was completed on the unit specified. FDR has determined that the volume serial or the VTOC location has changed. FDR has updated the UCB on this system. However, if other CPUs can access the unit through shared DASD, they will not know of this change and may not process this volume properly.  
**Action:** Normally all other systems should make this device offline prior to the restore, if the volume serial or VTOC will change. This message indicates that you may now remount the volume on the other systems. This message will only be issued if the VTOC location or volume serial has changed.

**FDRW05 DISK UNIT=uuu VOL=vvvvvv HAS BEEN RELABELED TO VOL=vvvvvv**

**Reason:** The unit indicated has been restored with a change of the volume serial number.  
**Action:** This is an informative message. FDRW04 will also be issued if volume is on a shared DASD device.

**FDRW06 DISK UNIT=uuu VOL=vvvvvv NOW OFFLINE—DUPLICATE VOLSER**

**Reason:** The volume being restored has been relabeled to the same volume serial as another unit already online. (MVS only).  
**Action:** FDR will set the UCB for this volume offline if it is permanently resident, else it will mark the volume not ready.

**FDRW22 DSN dsname PASSWORD PROTECTED**

**Reason:** A data set which is password protected is being backed up or restored.  
**Action:** To continue processing the operator must reply to the appropriate OS/VS password message.

Exception: If the VSAMPASS option has been enabled with FDRZAPOP, this message will be issued for every VSAM data space. If the data space does not contain any password-protected objects, no OS/VS password messages will follow. In that case, the FDRW22 message maybe ignored.

**FDRW23 DSN dsname DATE PROTECTED REPLY YES OR NO FOR ARCHIVE**

**Reason:** The data set described by the message has met the criteria for archiving or scratching it from disk, but the data set has not expired. The message will not be issued for VSAM clusters.  
**Action:** Reply YES—Archive and scratch the data set.  
 Reply NO—DO NOT archive the data set.  
 If you wish to suppress this message, specify EXPD=NONE on the DUMP TYPE=ARC command.

**FDRW24 FDRABR REQUEST FOR TAPES—vvvvvv... REPLY YES NO OR BYPASS**

**Reason:** The OPERATOR keyword was specified on a RESTORE command. A restore of a data set was requested from the backup tapes or disk volumes described by the message.  
**Action:** Reply YES—You have the volumes available.  
 Reply NO—You do not have the volumes available, or do not wish to mount them at this time.  
 Reply BYPASS—same as NO.

**FDRW25 ABR REQUEST FOR TAPES(nn) vvvvvv... REPLY YES NO OR BYPASS(NN)**

**Reason:** The OPERATOR keyword was specified on a RESTORE command for a full-volume RESTORE. Message FDRW25 will be repeated for each ABR backup that will be used during the RESTORE; each line shows the Cycle number (nn) followed by the volume serials of the tapes or disks required for that Cycle.

**Action:** Reply YES—All of the volumes are available.  
 Reply NO—All or some volumes are not available. The RESTORE request is cancelled.  
 Reply BYPASS(nn)—The tapes shown for Cycle (nn) will not be used during the restore. (nn) may be any Cycle that was listed, except Cycle zero (the full volume backup). After a reply of BYPASS(nn), the message will be reissued so that additional backups can be bypassed. When all desired backups to be bypassed have been specified, reply YES. Data sets that were backed up on the Cycles that you bypass will probably not be correctly restored.

**FDRW26 INVALID RESPONSE REPLY YES NO OR BYPASS(NN)**

**Reason:** The operator reply to Message FDRW25 was invalid. Either, the operator reply was an invalid keyword, the cycle number was invalid or did not exist, or the cycle number was zero.

**Action:** Give a proper response to the message.

**FDRW27 REPLY WAIT NOWAIT OR RETRY FOR ENQ WAIT ON DSN=dsname**

**Reason:** The user specified DSNENQ=HAVE for the data set specified. This data set is not currently available. Some other job has the data set allocated.

**Action:** Reply WAIT – FDR will wait for the data set to become available. The job could time out. WAIT cannot be specified if the Job Scheduler (JCL) has the data set specified.  
 Reply NOWAIT – FDR will issue a warning message for the data set.  
     On DUMP the data set will be dumped.  
     On ARCHIVE or SUPERSCRATCH the data set will be bypassed.  
     On RESTORE the data set will be bypassed.  
     On COMPAKTOR the data set will be made unmovable.  
 Reply RETRY – FDR will retry the enqueue.

**FDRW40 MODULE 'modname' INSTALLED AT address – VER nn**

**Reason:** The message is issued in response to a status request when the ABR operating system exit module 'modname' is installed in the system. The 'address' given is the virtual storage location of the named ABR module. The version level number is also given for the module.

**Action:** None, information message only.

**FDRW41 THE FDR SYSTEM MODULES ARE ACTIVE – VER nn****FDRW41 THE FDR SYSTEM MODULES ARE RE-ACTIVATED – VER nn****FDRW41 THE FDR SYSTEM OPTIONS ARE REFRESHED – VER nn**

**PROD**  
**TEST**

**JOBNAME=xxxxxxx | JOBGROUP=xxxxxxx**

**Reason:** This message is provided by FDRSTART or FDRSTATS when the ABR operating system exit modules are installed in the system. The status of the modules may be:  
 ACTIVE – on the first execution of FDRSTART or on executions of FDRSTATS;  
 RE-ACTIVATED – on executions of FDRSTART where an ABR operating system exit module was re-activated;  
 REFRESHED – on subsequent executions of FDRSTART where the copy of the FDR Global Options Table module in global storage was refreshed.  
 This message includes the version and release level of the modules installed. PROD or TEST JOBNAME=/ JOBGROUP= may also appear in the message when a test version of the ABR exits is installed.

**Action:** None, information message only.

**FDRW42 THE FDR SYSTEM MODULES ARE NOT ACTIVE****FDRW42 THE FDR SYSTEM MODULES ARE INACTIVE**

**PROD**  
**TEST**

**JOBNAME=xxxxxxx | JOBGROUP=xxxxxxx**

**Reason:** This message is provided by FDRPARE or FDRSTATS when the ABR operating system exit modules are disabled. The status of the modules may be:  
 NOT ACTIVE – when the ABR operating system exit modules are not installed in the system;  
 INACTIVE – when the ABR operating system exit modules are installed in the system but are disabled, i.e., not processing any requests.  
 PROD or TEST JOBNAME=/ JOBGROUP= may also appear in the message when a test version of the ABR exits is installed.

**Action:** None, information message only.

**FDRW44 IDPSTART ESTAE RECOVERY ENTERED FOR ABEND Sxxx Uxxxx AT OFFSET xxxx**

**Reason:** This message is provided by FDRSTART when an unexpected condition occurs. An attempt is made to provide diagnostic information.

**Action:** If the problem persists call INNOVATION for assistance.

**FDRW46 IDPSTART FAILURE – REASON=reason description**

**Reason:** The execution of FDRSTART or FDRSTATS failed for one of the following reasons:

- 01 – OPERATING SYSTEM NOT MVS SP 1.2 OR HIGHER. The FDR dynamic installation only supports MVS SP 1.2 and higher.
- 02 – INVALID INPUT PARAMETERS. An invalid keyword value was detected in the parm fieldat entry.
- 03 – UNABLE TO OBTAIN AUTHORIZATION. FDRSTART must be executed from an APF authorized library.
- 04 – FDRVECTB VECTOR TABLE IS INVALID. Call Innovation for assistance.
- 05 – SYSLIB DD MISSING OR OPEN ERROR.
- 06 – modname NOT FOUND IN SYSLIB. The ABR operating system exit module named in the message was not found in the library pointed to by the SYSLIB DD statement.
- 07 – modname MODULE LOAD ERROR. Call Innovation for assistance.
- 08 – ERROR MODIFYING THE SVC TABLE. Call Innovation for assistance.
- 09 – modname NOT FOUND. The module named in the message was not found in the link pack area. Call Innovation for assistance.
- 10 – modname NOT FOUND IN THE LINKLIST. The ABR operating system exit module named in the message was not found in a LINKLIST library that is APF authorized.
- 13 – modname MODULE ABOVE 16M ERROR. Call Innovation for assistance.
- 15 – modname HAS SMP INSTALLED IDP MODULE. FDRSTART detected the presence of an ABR operating system exit installed via SMP in the named module. The ABR operating system exits that are SMP installed must be removed if they are to be dynamically installed.
- 19 – modname CDE NOT FOUND. Call Innovation for assistance.
- 21 – ENQUEUE/DEQUEUE ERROR ON SYSZSVC.
- 22 – INVALID VECTOR TABLE STATUS. Call Innovation for assistance.
- 23 – INVALID VECTOR TABLE CDE ADDRESS. Call Innovation for assistance.
- 24 – RC=xxxx FROM SVCUPDTE. Call Innovation for assistance.
- 25 – NO MODULES TO INSTALL – FDROPT. The dynamic installation options that indicate which of the ABR operating system exits are to be installed specified that none of the exits are to be installed. These options (ABRLOC, ABRDSNF, ABRPRE, IEBCOPY) are set in the FDR Global Options Table, module FDROPT, using the ABR Install dialog (ISPF option A.I.4.11.1) or via the FDRZAPOP utility.
- 26 – FDR SYSTEM MODULES INSTALL CANCELLED. This message is displayed when the console operator replies NO to the FDRW47 message.
- 29 – FDROPT MODULE LEVEL IS NOT HIGH ENOUGH. The dynamic installation options are not present in the level of FDROPT that was loaded.
- 30 – PARM (PROD or TEST) not specified.

**Action:** If error cannot be determined, contact INNOVATION for assistance.

**FDRW47 CONFIRM REQUEST TO INSTALL THE FDR SYSTEM MODULES**

**Reason:** This WTO prompts the console operator whether to install the FDR operating system exits. This message is issued when the FDR Global Option CONFINST is enabled.

**Action:** Reply 'YES' to proceed or 'NO' to bypass the dynamic installation of the FDR operating system modules. Note: The FDR operating system modules should normally be installed as part of the IPL procedure.

**FDRW48 INVALID REPLY-PLEASE REPLY YES OR NO**

**Reason:** This message is issued when the reply to the FDRW47 WTO is invalid.

**Action:** The FDRW47 WTO is reissued.

**FDRW50 TSO RESTORE FAILURE-DSN=dsname**

**Reason:** The CATALOG LOCATE EXIT was attempting to restore the data set in the foreground under TSO and the restore failed. This will be accompanied by another FDRxxx message detailing the cause of the restore failure and either FDRW51 or FDRW52 if retry of failing TSO foreground restores is enabled. Note: FDRW50 is only issued under TSO and is ALWAYS issued as a TPUT (line mode) and will NOT be issued unless the user has chosen to retry failing foreground restores via the remote queue or a Started Task.

**Action:** None.





**FDRW57 UNCATALOGED FOR DELETE-DSN=dsname**

**Reason:** The CATALOG LOCATE EXIT detected an IDCAMS DELETE request for a data set ARCHIVED for auto recall (note that a TSO DELETE command uses IDCAMS service). The 'Uncatalog Delete' option, enabled by usermod LFDNMVS, is active. The locate generated by IDCAMS is failed with a return code of 8 (x'08') and a completion code of 42 (x'2a') is placed in Catalog Parameter List. The catalog entry indicating the data set is ARCHIVED for auto recall is removed (uncataloged). These actions will cause messages to be generated by IDCAMS:

IDC3009I \*\* VSAM CATALOG RETURN CODE IS 8

IDC0551I \*\* ENTRY dsname NOT DELETED

Note: FDRW57 may be issued as follows:

1. under TSO as a TPUT (line mode).
2. under BATCH as a WTO with route code 11.

**Action:** None, since the catalog entry has been removed. You may also disregard the IDC0551I message(s).

**FDRW58 DATA SET IN USE OR BEING RECALLED-RETRY ALLOCATION IN A FEW MINUTES**

**Reason:** The CATALOG LOCATE EXIT issued an ENQUEUE (under TSO or ROSCOE) to see if the data set listed in the FDRW70 message was available for use. The ENQUEUE showed the data set was allocated to another job or user.

Note: FDRW58 may be issued as follows:

1. under TSO as a TPUT (line mode).
2. under ROSCOE as a SEND (intercepted by the ROSCOE NOTIFY service).

**Action:** None.

**FDRW59 ABR AUTO RECALL CANCELLED-xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx**

**Reason:** The CATALOG LOCATE EXIT was entered because a CATALOG search (LOCATE) was issued for a data set that was ARCHIVED by ABR with the RECALL option. The CATALOG LOCATE EXIT terminated trying to invoke ABR. The description of the reason for termination will be one of the following:

1. ATTACH OF mmmmmmmm FAILED-RC=nnn The CATALOG exit attempted to invoke the program mmmmmmmm via ATTACH but it failed. The return code from register 15 is printed.
2. FDROPT LOAD FAILED-R1=xxxx/R15=xx The CATALOG exit attempted load FDROPT but it failed. The contents of the LOAD SVC return code registers 1 and 15 are printed, with register 1 showing the abend code that would have resulted if the FDROPT were executed as a processing program. I.E.: // EXEC PGM=FDROPT
3. FDROPT VERSION nnnn NOT SUPPORTED The nnnn is the version number of an incompatible ABR option table (FDROPT). The ABR library in the Linklist or STEPLIB/ABRLIB DD does not point to a version level which supports this function.
4. SYSZTIOT ENQUEUE ERROR-RC=nnn The nnn is the return code from a failing ENQUEUE SVC.
5. ATTACH NOT ATTEMPTED-SP251 in KEY 0 The CATALOG exit needed to attach a module that is linked non-reentrant. It would be loaded into subpool 251. This subpool has been acquired in protect key zero (0).

Note: FDRW59 is ALWAYS issued as a WTO with a route code of 11.

**Action:** If unable to correct, call Innovation for technical assistance.

**FDRW60 PARM FIELD NOT SPECIFIED-FDRAUTH TERMINATED**

**Reason:** Parameter field was not specified for FDRAUTH. It is required.

**Action:** Correct and resubmit job.

**FDRW61 PARM FIELD SYNTAX ERROR-FDRAUTH TERMINATED**

**Reason:** Parameter field contained invalid parameters for FDRAUTH.

**Action:** Correct and resubmit job.

**FDRW62 TASKLIB OPEN FAILED-DDNAME=ddddddd-FDRAUTH TERMINATED**

**Reason:** OPEN failed for DDNAME specified in the message.

**Action:** If the specified DDNAME is required for the operation of FDRAUTH, correct and resubmit job.

**FDRW63 ffffffff FAILED-RC=nnnn-FDRAUTH TERMINATED**

**Reason:** The system function specified by ffffffff failed with the indicated return code. ffffffff will be one of the following: ATTACH, ESTAE, STAX DEFER=YES

**Action:** If the condition is one which can be corrected, do so and resubmit the job. If required, contact INNOVATION for technical assistance.

**FDRW64 MODULE mmmmmmmmm NOT FOUND IN sssssss-FDRAUTH TERMINATED**

- Reason:** FDRAUTH issued a BLDL for the module mmmmmmmmm from either TASKLIB or the system link list. The module was not found, but was required.
- Action:**
1. If sssssss is TASKLIB, verify that the data set name specified on the ABRLIB DD statement is the correct one. If not, correct and resubmit job.
  2. If sssssss is SYSTEM, verify that the data set containing mmmmmmmmm is in the system link list. If not, use an ABRLIB DD statement.

**FDRW65 MODULE mmmmmmmmm LOAD FAILED-CONDITION=nnn-FDRAUTH TERMINATED**

- Reason:** FDRAUTH issued a LOAD for module mmmmmmmmm from either TASKLIB or the system link list. The LOAD failed with system ABEND code nnn.
- Action:** Determine the cause of the error from the ABEND code. If possible, correct and resubmit the job. If necessary, contact INNOVATION for technical assistance.

**FDRW66 SVC nnn NOT IN SYSTEM-AUTHORIZATION BYPASSED**

- Reason:** A request for authorization required the authorization SVC, but it was not defined in the system SVC table.
- Action:** Check the installation of the authorization SVC. If possible, correct and resubmit the job. If necessary, contact INNOVATION for technical assistance.

**FDRW67 PROGRAM=ppppppp COMPLETED-SYSTEM=sss-USER=uuuu**

- Reason:** The program ppppppp completed processing with a return code or ABEND code greater than zero. The system ABEND code, if any, is sss. The user (program) ABEND code or return code is uuuu.
- Action:** If possible, correct the problem indicated by the codes and resubmit the job. If necessary, call INNOVATION for technical assistance.

**FDRW69 xxxxxxxxxxxxxxxx-DSN=dsname**

- Reason:** The CATALOG LOCATE EXIT was attempting to reallocate a data set restored by ABR at step initiation. The data set, which was ARCHIVED from disk volume aaaaaa, was restored to disk volume bbbbbb as requested in the ABR ALLOCATE list. The attempt to reallocate the data set with dynamic allocation (SVC 99) failed for one of the following reasons:
1. READ JFCB FAILED – The RDJFCB for the DDname assigned to the data set issued a return code other than zero.
  2. DEALLOCATE FAILED – Dynamic deallocation of the DDname assigned to the data set issued a return code other than zero.
  3. REALLOCATE FAILED – Dynamic allocation of the DDname assigned to the data set issued a return code other than zero.
  4. EXCP OPEN FAILED – An EXCP open for input of the DDname assigned to the data set failed to open the data set (used to propagate DD statement overrides from the original allocation to the new disk volume).
  5. BSAM OPEN FAILED – A BSAM open for input of the DDname assigned to the JES input data set failed to open the data set (used to propagate DD statement overrides from the original allocation). This is used when it is necessary to reconcatenate a JES input data set with a data set recalled from ARCHIVE.
  6. TOO MANY DDNAMES – The data set was referenced by more than nine (9) DDnames in this job step. The first nine (9) DDnames have been reallocated.
  7. ddname BYPASSED – The DDname listed, either JOBLIB or STEPLIB, was not reallocated because it is currently OPEN.
  8. RECONCAT FAILED – Dynamic reconcatenation of DDname assigned to the data set issued a return code other than zero.
- Note: FDRW69 is ALWAYS issued as a WTO with a route code of 2,11 and a descriptor code of 6.
- Action:** Rerun the job IF the execution fails. The required data sets have been restored by ABR.

**FDRW70 ELIGIBLE FOR RECALL-DSN=dsname**

- Reason:** A CATALOG search (LOCATE) was issued in the foreground (TSO environment) for a data set which was ARCHIVED by ABR with the RECALL option.
- Note: FDRW70 may be issued as follows:
1. under TSO as a TPUT (line mode).
  2. under ROSCOE as a SEND (intercepted by the ROSCOE NOTIFY service).
- Action:** See message FDRW71.

**FDRW71 TYPE 'END' TO BYPASS THE RESTORE OR PRESS 'ENTER' TO CONTINUE**  
or this alternate message format

**FDRW71 TYPE 'YES' TO PERMIT THE RESTORE OR PRESS 'ENTER' TO BYPASS**

**Reason:** See message FDRW70.

Note: FDRW71 is only issued under TSO and is ALWAYS issued as a TPUT (line mode).

**Action:** Press the ENTER (or RETURN) key to allow the RESTORE to take place or type END to terminate the RESTORE.—

— or, using the alternate message format —

Type YES to allow the RESTORE to take place or press the ENTER (or RETURN) key to terminate the RESTORE.

**FDRW72 restore-option-REPLY 'xx'**

**Reason:** This message is issued one or more times to document the installation-authorized restore options available to TSO users, and the reply necessary to invoke each one.

Note: FDRW72 is only issued under TSO and is ALWAYS issued as a TPUT (line mode).

**Action:** See message FDRW73.

**FDRW73 TYPE THE APPROPRIATE RESPONSE OR 'END' TO TERMINATE THE RESTORE**

**Reason:** The TSO user is requested to select a restore option from those listed in FDRW72 messages.

Note: FDRW73 is only issued under TSO and is ALWAYS issued as a TPUT (line mode).

**Action:** Type in the 2-character response that corresponds to the restore option selected. If listed, a response of FG will perform an immediate foreground restore, BG will do an immediate restore via a background started task, and RQ will remote queue the request for later processing. For the last two options, you will be notified when the restore is complete.

**FDRW74 ABR AUTO RECALL ABNORMALLY TERMINATED COMP CODE=00sssuuu**

**Reason:** The CATALOG LOCATE EXIT was entered because a CATALOG search (LOCATE) was issued for a data set that was ARCHIVED by ABR with the RECALL option. ABR abnormally terminated trying to restore the data set. The completion code is formatted as follows:

sss—is the system ABEND code

uuu—is the user ABEND code.

Note: FDRW74 may be issued as follows:

1. under TSO as a TPUT (line mode).
2. under ROSCOE as a SEND (intercepted by the ROSCOE NOTIFY service).
3. under BATCH as a WTO with route code (2,11) and descriptor code (6).

**Action:** If unable to correct, call Innovation for technical assistance.

**FDRW75 RESTORE BYPASSED – JOB xxxxxxxx DATE: yyddd TIME: hhmmss DSN=dsname**

**Reason:** Data set was scheduled for ABR RECALL ARCHIVE RESTORE in step initiation but the RESTORE was never attempted because the job step flushed, probably due to a JCL error. The installation has requested that the CATALOG exit display the name of the failing job as well as the names of the data sets not restored.

Note: FDRW75 is ALWAYS issued as a WTO with a route code of 11.

**Action:** None.

**FDRW76 DATA SET IS SCHEDULED TO BE RESTORED TO VOLUME SERIAL NUMBER vvvvvv**

**Reason:** The data set listed in the FDRW70 message is scheduled to be restored to the disk volume with serial vvvvvv.

Note: FDRW76 is only issued under TSO and is ALWAYS issued as a TPUT (line mode).

**Action:** See Message FDRW77.

**FDRW77 TYPE NEW VOLUME SERIAL NUMBER AS XXXXXX OR PRESS 'ENTER' TO CONTINUE**

**Reason:** See message FDRW76.

Note: FDRW77 is only issued under TSO and is ALWAYS issued as a TPUT (line mode).

**Action:** If you wish to RESTORE the data set to a volume other than the original volume it was ARCHIVED from, type in a new volume serial number. Otherwise, press ENTER or RETURN to accept the default serial.

**FDRW78 RESTORE action description–YOU WILL BE NOTIFIED UPON COMPLETION**

**Reason:** The message describes the action the Catalog Locate Exit has performed to accomplish the restore of the data set listed in the FDRW70 message. The action may be:

1. START COMMAND ISSUED—identifying an asynchronous ABR ARCHIVE RESTORE in the background (BG).
2. STARTED IN FOREGROUND – identifying a synchronous ABR ARCHIVE RESTORE in the foreground (FG).
3. STARTED SYNCHRONOUSLY – identifying a synchronous ABR ARCHIVE RESTORE in an external address space.

Note: FDRW78 may be issued as follows:

1. under TSO as a TPUT (line mode).
2. under ROSCOE as a SEND (intercepted by the ROSCOE NOTIFY service).

**Action:** None

**FDRW79 RESTORE BYPASSED reason description**

**Reason:** The CATALOG LOCATE EXIT has determined that the RECALL of the data set cannot be done for one of the following reasons:

1. TSO RESTORE DISABLED—auto recall of ARCHIVED data sets is disabled for TSO users.
2. ROSCOE RESTORE DISABLED—auto recall of ARCHIVED data sets is disabled for ROSCOE users.
3. DEFAULT RESTORE TYPE IN ERROR—the default restore type established for TSO users is incorrect.
4. DEFAULT RESTORE TYPE IS DISABLED—the default restore type established for TSO users is disabled. The user will be prompted for another

Note: FDRW78 may be issued as follows:

1. under TSO as a TPUT (line mode).
2. under ROSCOE as a SEND (intercepted by the ROSCOE NOTIFY service).

**Action:** Correct if this is an error in the setup of the RECALL exit.

**FDRW80 CONFIRM REQUEST TO RECOVER VOL=vvvvvv FROM FAILED COMPAKTION –REPLY YES OR NO**

**Reason:** A Fast COMPAKTion (CPK TYPE=FASTCPK) was in progress on the indicated disk volume (see message CPK586W) but that COMPAKTion did not complete for some reason, such as a system crash. This Fast COMPAKTion job will automatically recover from the failure if the operator gives permission.

**Action:** Reply YES to allow the recovery to proceed; reply NO to bypass the recovery at this time. This message can be suppressed by specifying RECOVERY=YES on the CPK statement; it will proceed to do the recovery without asking the operator.

**If you reply NO, the volume will not be in a usable state. Many data sets may be unusable. You must submit another Fast COMPAKTion job and allow it to recover from the failure.**

**FDRW80 CONFIRM REQUEST TO COMPAKT UNIT=uuu,VOL=vvvvvv, JOB=jjjjjj**

**Reason:** To ensure that the volume being restored is the correct one, this WTOR is issued to allow the console operator a final verification prior to actual restoration.

**Action:** Reply 'YES' if COMPAKTOR is to continue.  
Reply 'NO' if job is to be terminated.

Note: You can specify CONFMESS=NO on the COMPAKT command to bypass this WTOR. [See Section 40.08](#) for further details.

**FDRW81 DETECTS UNIT=uuu,VOL=vvvvvv IN USE nnn. REPLY 'RETRY' OR 'EOJ'**

**Reason:** The count of open DCBs against the unit uuu, maintained in the UCB, is checked by COMPAKTOR. If not 0 or 1, this message is issued. The purpose of this is to ensure that no other jobs in the system are accessing the volume to be restored by COMPAKTOR. This message is also issued if the volume contains an active paging data set, or is the system residence volume.

**Action:** If you know which job is using the device, reply RETRY after it ends. If you are not sure, see the topic "Erroneous UCB Count" in [Section 40.24](#). If necessary, reply EOJ to terminate the COMPAKTOR job.

Note: You may also reply 'IGNORE' if you are doing an in-place COMPAKTion and have specified DUMP=YES and DSNENQ for any ACTIVE DATA SETS which are not marked as unmovable and have not specified TODD= or VTOC=COMPAKT. The keyword ACTMESS=NO on the COMPAKT statement will suppress this message. See the topic "COMPAKTING Active Volumes" in [Section 40.24](#).

FDRW82	COMPAKTOR	SPACE RELEASE   REORGANIZATION	STARTED VOL=vvvvvv
FDRW82	COMPAKTOR	SPACE RELEASE   REORGANIZATION	SUCCESSFUL VOL=vvvvvv
	Reason:	These write-to-operators are issued when LOG=YES is specified on the COMPAKTOR control statement. The "STARTED" write-to-operator will remain non-deletable from the console until the "SUCCESSFUL" write-to-operator is issued.	
	Action:	None. These write-to-operators are informative only.	
FDRW82	COMPAKTOR	SPACE RELEASE   REORGANIZATION	**FAILED** VOL=vvvvvv
	Reason:	This write-to-operator is issued when LOG=YES is specified on the COMPAKTOR control statement and a serious error occurs. This write-to-operator will remain non-deletable from the console.	
	Action:	Check the output from the COMPAKTOR run and then manually delete this write-to-operator from the console. The volumes should <b>not</b> be used until any problems are resolved ( <a href="#">See Section 40.23</a> ).	
FDRW89	FDR – TRIAL VERSION FROM INNOVATION DATA PROCESSING EXPIRES IN 'nnn' DAYS ( PLEASE CONTACT INNOVATION )		
	Reason:	This is a trial version of the FDR system. The number of days the trial will remain active is displayed.	
	Action:	When there are 10 or fewer days before the trial is due to expire this message will become non-deletable. Call INNOVATION for assistance.	
FDRW90	DSN=dsname NOT CATALOGED. REASON CODE=x RC=xxxx RS=xxxx		
	Reason:	This message is issued by module IGG0299A, IGG029DU (SCRATCH EXIT) or FDRPRE00 (DADSM Pre-exit) when it fails to catalog a data set being scratched or renamed. The ABR operating system exit tried to catalog a name consisting of '#' followed by the user's dsname, in order to record the ABR backup information.	

REASON CODE	EXPLANATION
-------------	-------------

- | REASON CODE    | EXPLANATION  |
|----------------|--|
| A              | An I/O error occurred reading the VTOC.  |
| B              | A locate operation on the ABR Scratch catalog failed. This message either contains the VSAM catalog return code and reason codes or is accompanied by the FDR516 message for a CVOL catalog. Refer to the IDC3009I message in the IBM System Messages manual for the meaning of the VSAM catalog return and reason codes. Refer to the FDR516 message for CVOL return codes.<br>Common causes for this message follows:<br>1) If the ABR Scratch Catalog is a CVOL, the data set being scratched may have been previously cataloged as a higher or lower index level (ex: DSN=A.B exists, A.B.C cannot be cataloged) or there is a GDG base name defined in the ABR Scratch catalog with the same data set name as the non-GDG data set name that is being processed, or vice-versa. Convert the ABR Scratch catalog from CVOL to ICF VSAM, where this restriction does not exist.<br>2) The ABR Scratch catalog may be full. Run the Scratch catalog maintenance utility ( <a href="#">Section 55.20</a> ) to cleanup unwanted entries.<br>3) A security system may have disallowed the operation. All users must be allowed to catalog names starting with '#.'. |
| C              | A catalog operation on the ABR Scratch catalog failed. See Reason B for problem determination.   |
| D              | The data set name being processed is all blanks.   |
| E              | The catalog locate request for the ABR Scratch catalog alias failed. The data set name displayed in the message contains the ABR Scratch catalog alias name.   |
| G              | Error creating a GDG base in the ABR Scratch catalog for recording a particular generation data set being scratched. See Reason B for problem determination.   |
| K              | The DADSM scratch or rename workarea was not found.  |
| L              | RESERVE/DEQ failed on SYSVTOC  |
| M              | I/O error on RENAME  |
| N              | The ABR DADSM Pre-exit detected an error during processing. Refer to the preceding message FDRW94 for error diagnosis.   |
| O              | The data set name plus the ABR Scratch prefix exceeded 44 characters, and was not recorded in the ABR Scratch catalog.   |
| P              | VTOC TTR conversion error  |
| Q              | OLDB in model and FDROPT differ  |
| R              | Unable to record DELETE VVR  |
| S              | GEN number in ABR model is zero  |
| <b>Action:</b> | This message may be accompanied by an IEC331I message indicating the specific type of error.If necessary, contact INNOVATION for assistance.   |

**FDRW92 MAXIMUM NUMBER OF ERRORS EXCEEDED LOG TERMINATED**

**Reason:** The Scratch Exit has issued the maximum number of FDRW90 error messages. No further messages will be issued until a re-IPL.  
The default is 100 messages.

**FDRW93 FDR DATA SET NOT FOUND EXIT ABNORMALLY TERMINATED COMP CODE= xxxxxxxx | ABEND Ssss Uuuuu**

**Reason:** The DATA SET NOT FOUND (S213) exit was entered for a data set whose name is contained in the preceding FDR316 message. ABR abnormally terminated in the attempt to RESTORE the data set from the ARCHIVE backup. Either the ABR return code (in hex) or the abend code are displayed in this message.

If the first two characters of xxxxxxxx are '0F', then the ATTACH SVC for FDRABR failed, and the remaining xxxxxx contains the hexadecimal return code from the ATTACH SVC.

**Action:** Contact INNOVATION for assistance.

**FDRW94 FDRPRE00 ESTAE RECOVERY ENTERED FOR ABEND Sxxx Uxxxx AT OFFSET xxxx**

**Reason:** This message is provided by FDRPRE00 when an unexpected condition occurs. An attempt is made to provide diagnostic information.

**Action:** Call INNOVATION for assistance.

**FDRW99 IF PROGRAM IS CANCELLED DATASETS| VOLUMES MAY BE CORRUPTED –  
REPLY S-STOP AT DATASET| VOLUME END I-IGNORE CANCEL C-TO CANCEL**

**Reason:** Operation issued a cancel on an FDR program. If cancel is allowed data sets or volumes may be corrupted.

**Action:** Reply S-Stop at data set end. By replying S, FDR will complete processing the data sets or volumes currently being compressed or reorganized and no new work will be started.

Reply I-Ignore cancel. The FDR job will continue and the operator cancel will be ignored.

Reply C-Do cancel. The FDR job will be cancelled and data sets can be corrupted by this action. We strongly recommend that you do not specify C and use S-Stop at data set end or in the future use the operator commands as documented in [Section 25.06](#).

## 80.03 MESSAGES FROM FDR, DSF AND ABR

**FDR001 FAST DUMP RESTORE – FULL VOLUME – VER 5.2zaab****– INNOVATION DATA PROCESSING DATE=yy.ddd PAGE nnn**

**Reason:** This is the FDR page heading, specifying the version level of FDR. "z" will be "/" for the base release, and will be a letter (e.g., "A") for subsequent releases. "aa" is a 2-digit number indicating the level of integrated maintenance. "b" will be "P" for a production version, "T" for a trial, and "B" for a beta test version.

**FDR002 function SUCCESSFULLY COMPLETED****FROM VOL=vvvvvv | VOL=vvvvvv | NVOL=nnnnnn**

**Reason:** The disk with volume serial vvvvvv was successfully dumped, restored, copied, moved or simulated. On a full volume restore, vvvvvv is the serial number of the pack from which the dumps were created and nnnnnn is the serial number of the receiving pack before the restore.

**FDR003 NON-STANDARD RECORD ZERO – cccchhhrrrklill – DUMP/RESTORE CONTINUING**

**Reason:** FDR detected a non-standard record zero on the pack. The count field of the record zero is printed in hex. A standard IBM record zero format has a kllll field of 000008 – that is, no key and an eight byte data length field. FDR will DUMP/RESTORE a record zero with a data length of eight or fewer bytes as it appears on the disk. Data in a record zero in excess of eight bytes will be lost. A non-standard record zero can cause problems in direct or indexed-sequential processing.

**Action:** If the llll portion is approximately the track capacity (Ex: X'4B36' on a 3350), the cause is probably an INIT or INSPECT command using the IBM product ICKDSF. Rerun ICKDSF against this track with the INSPECT command NOPRESERVE. Contact INNOVATION for assistance.

**FDR006 function OPERATION CANCELLED BY OPERATOR**

**Reason:** An operator replied 'NO' to an FDR/DSF request for approval to restore or copy a disk. A U0801 Abend follows.

**FDR007 STARTING | ENDING TIME OF function – hh.mm.ss – UNIT=disktype | IN=inputdd | OUTPUT=outdd1 | outdd2**

**Reason:** Documents the time that FDR, DSF, or ABR began or ended a dump, restore, or copy. "inputdd" is the input DD name. "outdd1" is the output DD name and "disktype" identifies the input or output disk device type and can be: 2314, 2305-01, 2305-02, 3330, 3330-11, 3340-35, 3340-70, 3350, 3375, 3380, 3380-E, 3380-K, 3390-1, 3390-2, 3390-3, 9340-1 or 9340-2. If a duplicate backup was requested, it is shown by DD name "outdd2". On a data set restore or copy/move, since data sets may be output to multiple devices at once, the disk type and output DD names are not shown (output volumes are shown in message FDR311).

**FDR008 OPEN ERROR OR NO DD STATEMENT DD=ddname–function BYPASSED**

**Reason:** 1. A disk or tape DD statement specified by ddname was missing. For dumping, pairs of disk and tape DD statements with DDNAMEs TAPEX and DISKX, where x is an alpha-numeric character must appear (non-ABR only).  
2. DDNAME SYSPRINX is missing. A triplet of DISKX, TAPEX and SYSPRINX is required if FDR or DSF is in attach mode.  
3. An error occurred in label processing for the specified ddname.

**Action:** The disk in error will be bypassed.

**FDR010 POSSIBLE SPACE ERRORS IN VTOC – ENTIRE PACK WILL BE DUMPED**

**Reason:** FDR detected an I/O error or logical error reading the VTOC. A MINI DUMP is printed detailing the error. FDR will continue processing, dumping the entire disk volume.

**Action:** Contact INNOVATION for assistance.

**FDR012 NOT AN FDR TAPE DSN=dsname**

**Reason:** 1. The tape input for a restore is not an FDR created tape.  
2. A non-labelled tape with a tape mark preceding the first file the JCL statement. Use LABEL=(,LTM) instead.  
3. The JCL specifies the wrong serial numbers, or specifies the serial in the wrong order.  
4. The FDR backup file may have been written over.

**Action:** The data set name printed is the tape data set name. A MINI DUMP is printed displaying the tape block read.

A U0205 Abend is issued.



**FDR014 TAPE BACKUP IS INCOMPATIBLE WITH RESTORE DEVICE**

**Reason:** An attempt was made to do a full-volume restore or copy to an unlike device type (e.g.: 3380 to 3390). Use FDRDSF, FDRCOPY, or FDRABR to restore to a device with a different device geometry.

**Action:** The FDR header read is printed in a MINI DUMP. Contact INNOVATION for assistance. A U0104 Abend follows.

**FDR019 RACF FACILITY PROTECTION FOR BYPASS FAILED FOR xxxx**

**Reason:** On a system with SMS active, the operands BYPASSACS or BYPASSSMS were specified. To use these the user must be authorized to the RACF resources  
STGADMIN.ADR.RESTORE.BYPASSACS (for restore)  
or STGADMIN.ADR.COPY.BYPASSACS (for copies)  
in class FACILITY or the equivalent in other security systems.

**Action:** A control card error is issued.

**FDR020 RACF VOLUME PROTECTION FAILED ON VOL=vvvvvv**

**Reason:** A full pack dump or restore was requested by a user not authorized for this operation.

**Action:** A U0801 Abend is issued.

**FDR021 RACF DATA SET PROTECTION FAILED ON DSN=dsname**

**Reason:** RACF protection was enabled in FDR. The user did not have sufficient authorization to access this data set.

**Action:** On a full volume DUMP operation, the backup is terminated.  
On a data set DUMP operation, this data set is bypassed.

**FDR022 RESTORE TAPE IS A DSF FORMATTED TAPE**

**Reason:** A full pack restore was requested from a DSF formatted tape. This backup may not contain an image of the entire volume.

**Action:** Normally FDR will terminate the RESTORE with a U0205 ABEND. If TAPE=DSF was coded on the RESTORE control statement, FDR will continue the RESTORE. Warning messages will be issued if the volume LABEL or VTOC were not found on the tape.

**FDR023 DUMMY VTOC READ – ENTIRE PACK WILL BE DUMPED**

**Reason:** FDR found that the VTOC on this pack started and ended on cylinder zero head zero.

**Action:** FDR will dump the entire volume.

**FDR024 INVALID EXTENT DESCRIPTOR**

**Reason:** FDR read a DSCB (Format 1 or 3) which contained an invalid extent description. The first five bytes of the DSCB printed after the registers in the MINI DUMP is the cylinder, head, and record number of the DSCB.

1. If an FDR dump, the entire pack will be dumped.

2. If a data set backup, DSF will Abend with a U0110.

3. If an absolute track statement was specified, the user specified an address greater than maximum cylinder number or track number.

**Action:** If absolute track statement is in error, correct that control statement. If not, scratch the data set in error. Contact INNOVATION for assistance.

**FDR030 INVALID PARM FIELD PASSED TO FDR**

**Reason:** The user specified a PARM parameter to program FDR. The PARM field did not specify the value 'A' 'D' 'N' or 'R'.

**Action:** A U0405 ABEND follows. Correct PARM field and re-submit job.

**FDR031 DD=ddname – NUMBER OF CHARACTERS EXCEEDS 5 – STATEMENT IGNORED**

**Reason:** FDR encountered a DD statement starting with the characters 'DISK', which contained an identifier greater than 1 character. (Example: DISKAA).

**Action:** This statement is ignored and FDR will attempt to process the remaining 'DISK' DD statements.

**FDR032 NO VALID DISK(x) DD STATEMENTS WERE FOUND**

**Reason:** FDR did not find any DD statement starting with the characters 'DISK'.

**Action:** FDR did not dump any disk volumes.

**FDR033 CONTROL OPTION CONFLICTS WITH PARM FIELD OR ANOTHER OPTION – JOB TERMINATED**

**Reason:** 1. User specified a SYSIN control statement to FDR. The control statement specified a DUMP operation, yet the PARM field specified a RESTORE(PARM=R or N) or vice versa.  
 2. User specified CPYVOLID which was in conflict with the PARM field.  
 3. User specified a PARM field with a control statement of COPY.  
 4. User specified ATTACH(PARM=A) and LOAD.  
 5. User specified both DUMP and RESTORE commands.

**FDR034 MAXIMUM NUMBER OF DISK(x) DD STATEMENT EXCEEDED – JOB TERMINATED**

**Reason:** User exceeded the maximum number of disk volumes to be dumped. FDR processed the first 39 disk volumes.  
**Action:** A U0502 Abend is issued. Any following DISK DD statements will not be processed.

**FDR035 NO DSNAME CONTROL STATEMENTS FOUND – DSF TERMINATED**

**Reason:** The control statements specified to FDRDSF did not specify that any useful work was to be done. User did not specify that any data sets were to be dumped. At least one SELECT statement must be specified or DSN=ALL specified on the DUMP control statement.  
**Action:** Correct control statements and re-submit job.

**FDR036 UNSUPPORTED DISK DEVICE TYPE ON DDNAME=ddname**

**Reason:** FDR encountered a disk device or a backup of a disk device which is not supported. It is possible that a back level release of FDR is being used.  
**Action:** Contact INNOVATION for assistance.

**FDR040 VOLUME IN USE – nnn OPENED DCBS**

**Reason:** FDR on a full volume dump or restore found the volume currently being used by other jobs. The number of opened DCBs (minus one for FDR) is printed. This is the count in the UCB at the beginning of the dump or restore. This is only a warning message, no error code is issued.  
**Action:** If you do not want this message printed, the operand ACTMESS=NO will suppress the message.

**FDR042 RESTORE FROM BACKUP OF VOL=vvvvvvv CREATED ON DATE=yy.ddd TIME=hh.mm.ss**

**Reason:** Documents the creation time and date of the backup from which a restore is being done, as well as the original volume serial (vvvvvvv) of the disk that was dumped.

**FDR090 DIAGNOSTIC MINI DUMP-FDRDMPRT VER n.nzaab-INNOVATION DATA PROCESSINGDATE/TIME – yyddd/hh.mm.ss PAGE – nn**

**Reason:** General page heading for the MINI DUMP processor listing the version, level, date, time and page.

**FDR091 REGS**

**Reason:** Data formatted by the MINI DUMP processor, printing from 1 to 16 general registers and, optionally, related storage. All register oriented data is identified by this message number.

**FDR092 type LEN=nnnn(hhhh) LOC=lllll**

**Reason:** Control block formatted by the MINI DUMP processor. 'type' is the name of the control block, 'nnnn' is the length in decimal, 'hhhh' is the length in hex, and 'lllll' is the storage location in hex.

**FDR093 CCWS LEN=nnnn(hhhh)**

**Reason:** CCWs formatted by the MINI DUMP processor.

**FDR094 reason – CCWS NOT PRINTED(TERMINATED)**

**Reason:** An FDR related program requested a MINI DUMP with CCW formatting. However, for the reason printed, CCW printing was terminated.  
**Action:** Contact INNOVATION for further problem determination.

**FDR099 NEAR RELATIVE DATA LOCATION nnn – error description**

**Reason:** The common parsing routine encountered an error in parsing the user specified control statements. The approximate location of the error was position nnn, counting the first position as 000.  
**Action:** Correct error described in 'error description' and re-submit job.

**FDR101 FAST DUMP RESTORE DATA SET FUNCTIONS – VER x.yzaab – INNOVATION DATA PROCESSING  
DATE=yy.ddd PAGE nnn**

**Reason:** This is the DSF page heading, specifying the version level of DSF. "z" will be "/" for the base release, and will be a letter (e.g., "A") for subsequent releases. "aa" is a 2-digit number indicating the level of integrated maintenance. "b" will be "P" for a production version, "T" for a trial, and "B" for a betatest version.

**FDR106 DATA SET NOT ON VOL=vvvvvv DSN=dsname**

**Reason:** When restoring more generations of a GDG than the index will hold, the older generations may be deleted by catalog action between allocation and restore. **Action:** Restore only one generation per run, or restore with NEWNAME/NEWG/NEWI/NEWDD.

**FDR107 function SUCCESSFULLY COMPLETED VOL=vvvvvv**

**Reason:** The requested function was completed to the disk with volume serial vvvvvv.

**FDR108 WARNING – LABEL OR TRACK IN VTOC RESTORED X'cccchhh'**

**Reason:** The user requested an ABSOLUTE TRACK restore specifying tracks in the VTOC or volume LABEL. The cylinder and head restored is printed.

**FDR109 TAPE NOT FORMATTED FOR DATA SET RESTORE**

**Reason:** 1. An FDR tape which did not provide DSF control information was specified for a data set restore.  
2. A DSF tape created by absolute track dump was specified for a data set restore.

**Action:** Data set restores cannot be performed with these tapes, but absolute track restores can.

A U0202 Abend follows.

**FDR111 VOL=vvvvvv DSN=dsname HAS INSUFFICIENT SPACE ALLOCATED nnnnn TRACKS |  
IS UNMOVABLE | IS TOO LARGE**

**NUMBER OF TRACKS NECESSARY=ttttt**  
**EXTENT CYL=cccc TRK=ttt,CYL=cccc TRK=tttt**

**Reason:** This message consists of two lines, followed by from one to one hundred twenty-eight extent lines. The primary allocation for data set "dsname" on volume "vvvvvv" was preallocated but was not allocated with sufficient space for the RESTORE or did not specify the correct physical address for an unmovable data set.

"nnnnn" is the number of preallocated tracks.

The total space required to RESTORE the data set is shown in the NUMBER OF TRACKS NECESSARY message. If the data set is sequential or partitioned, this amount of space may be less than the data set originally occupied, since FDRDSF only requires as much space as was actually used. However, you must allocate all of this space in the primary allocation, since FDRDSF cannot extend a data set to secondary allocations during the restore.

The original physical addresses of the data set are shown in the EXTENT messages in decimal format. If the data set is unmovable these are the space allocations which must exist to proceed with a Data Set Restore. You must allocate the data set with the same extents and in the same order.

If the text "IS TOO LARGE" is displayed, this indicates that an ICF VSAM index component was preallocated with a larger number of tracks than it contained when the DUMP was performed. Use IDCAMS to DELETE the KSDS cluster and let FDR perform the allocation.

**Action:** The data set will not be restored.

Scratch the data set. In most cases, simply re-run the restore and FDR will allocate the data set properly. In some cases you may need to preallocate the data set with the allocations shown.

**FDR120 INVALID DEVICE TYPE – function TERMINATED**

**Reason:** The FDR system does not support this disk device.

**Action:** A U0103 Abend follows. Contact INNOVATION for assistance.

**FDR121 ALTERNATE ERROR REASON=*n* ON TRACK CYL | HEAD=ccccchhhh  
ASSIGNED TO PRIME CYL | HEAD=ccccchhhh PRIME R0=ccccchhhh**

**Reason:** FDR detected an error or unusual condition with the alternate track assignments on the disk volume being processed. ASSIGNED TO PRIME is printed if FDR can determine the prime track.

Note: In many cases, this message is informative and may not result in an error. This message does not set a non-zero return code or cause an ABEND.

**REASON CODE EXPLANATION**

- 1 – I/O error occurred reading this alternate cylinder and head. Under VM, if the IOB in the MINI DUMP starts with '46008000', the volume is defined as a mini-pack without the alternate tracks included. See VM Environment in [Section 10](#).
- 2 – This alternate is flagged as a defective alternate. FDR will bypass this alternate track. No corrective action is required.
- 3 – The alternate track is assigned to a prime track. The alternate home address does not have the flag byte set indicating that this is an alternate track.
- 4 – I/O error occurred reading the prime track assigned to this alternate.
- 5 – The prime track's home address flag byte did not indicate that this is a defective track.
- 6 – The prime track's record zero did not point back to this alternate track. (PRIME R0=) contains data read. If the PRIME R0 points to another alternate track, this track has had an alternate assigned to it multiple times.

**Action:** FDR will continue, bypassing this alternate. If the prime data track is to be dumped, FDR may issue additional error messages.

Contact INNOVATION for assistance.

**FDR122n INFORMATION HEADER**

**Reason:** FDR prints internal status information at the successful termination of this subtask operation. The character "n" after the FDR122 indicates the format of the backup O-OLD FORMAT N-NEW FORMAT and S-SPLIT FORMAT. On Restore operations, this field may indicate N for a backup created using the old format.

BYTES	–	Number of bytes of data dumped to tape or read from tape (for DSF, all bytes read even if not RESTORED.)
DSK TRK	–	Number of disk tracks accessed to perform this function.
T BLKS	–	Number of tape blocks written or read. On COPY this is an internal number of blocks passed from the dump.
RESTART	–	Internal field
STIMERS	–	Internal number of STIMER commands issued.
ERRS	–	Using BUFNO=MAX, this is the number of tracks in error.
ACT DSK	–	Actual number of disk tracks dumped or copied.
LOW	–	If not BUFNO=MAX, this is the lowest number of STIMERS issued on one cylinder.
	–	If BUFNO=MAX, this is the number of retries on tracks with data checks. Unless a FDR129 error message is displayed, the retries were successful.
HGH	–	If not BUFNO=MAX, this is the highest number of STIMERS issued on one cylinder.
	–	If BUFNO=MAX, this is the number of count fields encountered with a CCHH which did not match the track it resides on. This is normal on a VM mini-disk.
DEXCP	–	The number of disk EXCPs issued by this subtask to dump this volume. This number may be less than the SMF disk EXCPs.
NUMDS	–	Number of data sets processed in this backup. If an ABR incremental backup, this value includes the backup of the ABR model DSCB.
COMP BYTES	–	The number of bytes to which the data was compressed.

**FDR123 COUNT RECORD ERROR ON TRACK X'ccccchhhh' REASON=n**

**Reason:** FDR detected an error on the count fields of the cylinder (cccc) indicated. Reason codes 1 through 6 can only occur if BUFNO=MAX is not in effect (BUFNO=MAX is the default in V5.1 except when outputting to disk or dumping in SPLIT format). The head (hhhh) number printed may not be accurate. An I/O error may also occur during the actual dump of data from the track. An FDR MINI DUMP will be printed. If a cylinder has more than one count error, only one FDR123 message will be issued per track. The description of "DISK I/O ERRORS" in [Section 52.10](#) may be helpful in understanding the error.

<b>REASON CODE</b>	<b>EXPLANATION</b>
--------------------	--------------------

- |     |   |
|-----|---|
| 1 – | The number of count fields read on this cylinder exceeded the maximum number FDR expects for this device. The remaining count fields will be bypassed.  |
| 2 – | I/O error occurred reading the count fields. The head number in the message is probably not correct. THE ENTIRE CYLINDER WILL BE BYPASSED. The IOB details the error.   |
| 3 – | The number of bytes on this cylinder and head exceeds the maximum set by FDR. If it does not exceed the FDR maximum buffer size FDR will process this track. WARNING: This track may cause an I/O error when reading the data or the track may not be restorable. If the number of bytes exceeds the buffer size, the entire cylinder will be bypassed. |
| 4 – | Count field is out of sequence. The count field encountered has a head number lower than the previous count field. FDR will process this record as if it was the next sequential record. This track may not be correctly dumped.  |
| 5 – | The length of the count fields on this track develop into a negative number. FDR will issue a U0300 Abend.  |
| 6 – | The head number on one or more count fields was higher than the maximum number of tracks per cylinder. FDR will bypass the records from the point of error to the end of the cylinder. The head number in the message has no significance.  |
| 7 – | Count field has an incorrect cylinder and head number using BUFNO=MAX.  |
| 8 – | Deblocking the buffer when using BUFNO=MAX resulted in the data exceeding the track capacity.   |

**Action:** The unlabeled block of storage at the end of the MINI-DUMP contains the count fields read. Each count is 8 bytes (2 words) long and consists of the CC (cylinder), HH (head), R (record), K (key length) and DD (data length). The count field causing the error is usually the first one on the third line of counts. Contact INNOVATION for assistance.

**FDR124 FORMAT 4 ERROR REASON=n**

**Reason:** FDR detected an error with the Format 4 DSCB. The VTOC may be improperly formatted.

<b>REASON CODE</b>	<b>EXPLANATION</b>
--------------------	--------------------

- |     |  |
|-----|--|
| 1 – | More than one (1) Format 4 was found, or the first entry in the VTOC was not a Format 4. This may be due to an IBM problem.  |
| 2 – | FDR found the Format 4 contained zero (0) free DSCB's plus the high water mark was set to the first Format 5. This is the condition in which CPK would leave the volume if an ABEND or system crash occurred during the restore phase. This volume may be partially restored. <b>This is a very serious problem. The volume should be placed offline until the error is corrected.</b> See <a href="#">Section 40.23</a> on a procedure to recover the volume. If you must dump the volume, specify PROT=NONE on the DUMP TYPE= command. |

**Action:** A U0602 Abend will be issued. Contact INNOVATION for assistance with an IEHLIST LISTVTOC DUMP listing.

**FDR125 I/O ERROR READING THE VTOC X'ccccchhhh' [VOL=vvvvvv] TRACK WILL BE BYPASSED**

**Reason:** FDR detected an I/O error reading the VTOC on the cylinder and head indicated in hex. An FDR MINI DUMP is printed. The DSCBs stored on this track of the VTOC will not be processed. This error may also be caused by an improperly formatted VTOC track. CPK cannot restore from this backup.

**Action:** Correct the VTOC or contact INNOVATION for assistance.

**FDR126 ERROR PROCESSING FORMAT 2 OR 3**

**Reason:** FDR attempted to read the Format 2 or 3 associated with a Format 1. The location pointed to by the Format 1 does not indicate the proper DSCB ID. The chain may be broken.

**Action:** Correct or scratch this data set or contact INNOVATION for assistance with an IEHLIST LISTVTOC DUMP listing.

**FDR127 DISK TRACK CROSS-CHECK ERROR CYL/HEAD=ccccchhh - DUMP CONTINUING**

**Reason:** FDR detected that the record length fields developed for a tape block were inconsistent with the count fields of the data dumped.

**Action:** Contact INNOVATION for assistance.

**FDR128 INVALID RECORD ZERO ON TRACK X'ccccchhhh' DATA X'ccccchhhh'**

**Reason:** The track specified has an invalid record zero. The data specified is the cylinder and head (in hex) information read by FDR for this track. The hardware or OS may have seeked to an incorrect address. If an FDR129 message was issued for the same cylinder the errors may be related to each other.

**Action:** FDR will bypass this track on the disk and continue processing the volume. Contact INNOVATION for assistance.

**FDR129 I/O ERROR ON DISK PACK-LAST HOME ADDRESS READ X'ccccchhhh'**

**Reason:** An I/O error or logical error was detected by FDR on this volume. The cylinder and head (in hex) printed may not be accurate. An IEA000I or IOS000I IBM message may also have been printed on the Job log. An FDR MINI DUMP is produced detailing the error.

**Action:** FDR will attempt to continue processing from this point, bypassing the track in error. An FDR150 message may also be issued. If the error is a data check or other hardware problem, the pack must be corrected. See "DISK I/O ERRORS" in [Section 52.10](#) for help in understanding the error. Contact INNOVATION for technical assistance.

**FDR130 CYL=cccc HEAD xxx...x WAS function**

**Reason:** Internal message on each cylinder and head dumped or restored. An X appears for each track accessed within the cylinder. "cccc" is the cylinder number in decimal.

**FDR131 YOU ARE NOT LICENSED FOR FUNCTION function - CONTACT INNOVATION FOR LICENSE REQUIREMENTS**

**Reason:** Either you are not licensed for FDRREORG and you attempted to use the FDRCOPY REORG function, or you are licensed only for FDRREORG and you attempted to use a FDRDSF/FDRCOPY function other than REORG.

**FDR138 UNABLE TO RESTORE DSN=dsname REASON=reason**

**Reason:** A restore did not complete successfully. "reason" is a reason code plus explanatory text as shown below. Some, but not all, of the reasons below occur only during logical restore.

- | <b>REASON CODE</b> | <b>EXPLANATION</b>  |
|--------------------|---|
| <b>4 -</b>         | <b>CONTAINS TRACK OVERFLOW RECORDS</b> – data sets formatted with track overflow records (supported only on 3350 and earlier disks) cannot be restored logically).  |
| <b>7 -</b>         | <b>UNSUPPORTED DSORG</b> – these data sets are not supported for logical restore.<br><b>BDAM ABSOLUTE KEY RANGE OR SPANNED NON ICF VSAM VSAM MULTI-VOLUME ISAM NOT SUPPORTED</b> – see member ISAM in the ICL library   |
| <b>9 -</b>         | <b>BLOCK SIZE LARGER THAN TRK SIZE</b> – on a logical restore, a data block larger than the output track size was found. Use BLKF= if the data set is DSORG=PS.<br><b>TOTAL BLOCKS LARGER THAN TRK SIZE</b> – on a logical restore where track image mode was forced (see msg FDR139), the data from one track of the input data set will not fit on a track of the output data set. Message FDR151 will be printed to identify the output track. This message may also occur if an input data set was identified as having multiple extents not in ascending order on the backup or input disk, indicating that track image mode was attempted but failed, probably because of very small blocks in the input data set (for a PDS from a 3380 being restored to a 3390, this will occur if the PDS has a directory with over 45 blocks). See "Action". |
| <b>A -</b>         | <b>CATALOG/VVDS/PAGE TO UNLIKE SYS1.LOGREC OR VTOCIX TO UNLIKE</b> – logical restore cannot restore catalogs, VVDSs, VTOC indexes, page/swap data sets or LOGREC data sets.   |
| <b>B -</b>         | <b>DATA SET IS UNMOVABLE</b>  |
| <b>F -</b>         | <b>SPACE IS TOO SMALL FOR DATA SET</b> – during a logical restore, the allocated space was too small for the reformatted data. If FDR allocated the data set, this may be due to very small blocks in the data set. The CYL= or TRK= operands may be used to increase the size of individual data sets, or the MULTF=nnn (nnn is a percentage such as "105") operand may be used on the RESTORE/COPY/MOVE statement to increase the size of all data sets.  |
| <b>L -</b>         | <b>I/O ERROR WRITING TO DATA SET</b>  |
| <b>Q -</b>         | <b>REBLOCK ERROR– DEBLOCK ERROR – KEYED RECORD</b><br>– RESIZE OVER MAX– BLKSIZE ERROR<br>– INSUFFICIENT CORE   |
| <b>R -</b>         | <b>PDS DIRECTORY– DOES NOT FIT</b> – logical errors in a PDS.<br>– LENGTH INVALID – <b>MAX TTRS EXCEEDED</b><br>– NO BLOCKS FOUND – <b>TTRN NOT FOUND</b><br>– NOTE LIST ERROR – <b>TTR EXCEEDS 127</b><br>– IN MULTIPLE XTNTS – <b>EOF NOT FOUND</b><br>– I/O ERROR  |
| <b>T -</b>         | <b>TAPE BLOCK DEBLOCK ERROR</b>   |
| <b>U -</b>         | <b>END OF FILE NOT FOUND ON INPUT</b> – during a logical restore, an expected EOF record was not found within the dumped tracks of the data set; the data set may be usable.  |
| <b>V -</b>         | <b>VSAM ERROR– BLOCKSIZE TOO LARGE</b> – logical errors in a cluster.<br>– INSUFFICIENT CORE – <b>INVALID BLOCKSIZE</b><br>– TRACK SEQUENCE ERROR – <b>MISSING TRACKS</b><br>– TARGET DEV TOO SMALL – <b>MISSING BLOCKS IN CA</b><br>– SEQUENCE SET ERROR – <b>PRE-ALLOCATED</b><br>– ALLOCATION TOO SMALL – <b>HIGH USED RBA INVALID</b><br>– TRACK OVERFLOW – <b>EXTENT NOT MULTIPLE OF CA</b>  |
| <b>X -</b>         | <b>DATASET WAS EXCLUDED</b>   |
| <b>Y -</b>         | <b>TRACKS OUT OF ORDER FROM INPUT</b> – on a logical restore, the tracks of the original non-VSAM data set were in multiple extents and not in ascending order on the backup or input disk. See "Action".   |
| <b>Action:</b>     | Correct the error, if possible, and rerun. If this was a logical restore or copy/move to an unlike device, it may be possible to do a physical restore/copy/move to a like device (same device type). If the error was due to multiple extents not in ascending order on a non-VSAM data set (REASON=Y or REASON=9), it may be possible restore or copy/move to a like device to reallocate the data set in a single extent then copy/move it to the unlike device (or use COMPAKTOR on the input disk to combine the extents of the data set). Read member UNLIKE in the ICL (Installation Control Library) for more details. Contact Innovation if you need assistance.   |

**FDR139 TRACKIMAGE FORCED DSN=dsname REASON=7 BDAM VARIABLE OR UNDEFINED**

**Reason:** A logical restore of a BDAM (DA) data set with variable or undefined format will be done in track-image mode, restoring tracks exactly as they were dumped.

**Action:** None. This is a warning only.

**FDR139 WARNING DSN=dsname REASON=7 CLUSTER NOT LOADED**

**Reason:** An attempt was made to perform a logical restore of an empty ICF VSAM cluster. FDR will only allocate and catalog this cluster.

**Action:** None. This is a warning only.

**FDR139 WARNING DSN=dsname REASON=W MISSING TTR FROM MEMBER=member | MISSING NOTE LIST TTR**

**Reason:** During a logical restore or REORG of a PDS, a TTR pointer in the PDS directory or in a note list within a member did not point to any record in the original PDS. This TTR was in error before FDR restored or REORGed the PDS.

**Action:** The TTR will not be changed. It will still be invalid after the restore/REORG. All other members will be processed. You should investigate the indicated member; it should probably be deleted.

**FDR139 WARNING DSN=dsname REASON=U END OF FILE NOT FOUND ON INPUT**

**Reason:** During a logical restore of a PS or DA file, no EOF was found in the data set. However, all tracks were restored so the data set should be valid.

**FDR139 WARNING DSN=dsname DATA=ALL IGNORED DUE TO DUMP OPTIONS**

**Reason:** During a logical restore DATA=ALL was specified, but the dump was not done with DATA=ALL.

**Action:** DATA=ALL is ignored. The data set should be usable.

**FDR139 REORG BYPASSED reason DSN=dsname**

**Reason:** A FDRCOPY REORG was required for the indicated data set, but it could not be done for the "reason" indicated:

PDSE – PDSEs are not supported for REORG  
 UNMOVABLE – the data set's DSORG was POU  
 MODEL – the data set has no extents  
 NOT A PDS – the data set was not partitioned

**FDR142 ERROR USING THE READ MULTIPLE CKD COMMAND (5E) – NEW PERFORMANCE OPTION TERMINATED**

**Reason:** FDR detected an error using the 5E command. This control unit may not support the command.

**Action:** FDR will revert to the previous performance option. Contact INNOVATION for assistance.

**FDR150 DISK TRACK X'cccchhhh' BYPASSED–ERROR WHEN DUMPED**

**Reason:** FDR detected an I/O error or logical error when this track was dumped. An FDR129 message may have been issued detailing the error. Since the data was not properly dumped, FDR will not restore the track on the restore function.

**Action:** The data set associated with this track may be incomplete. On a data set restore, message FDR155 will indicate the dsname. If message FDR155 does not appear, the track was not needed for this restore. If appropriate, contact INNOVATION for assistance.

**FDR151 I/O ERROR DSN=dsname****FDR151 I/O ERROR WRITING DISK TRACK X'cccchhhh' VOL=vvvvvv TRACK BYPASSED**

**Reason:** FDR detected an I/O error writing the disk track at cylinder cccc track hhhh (both are in hex). For a dataset restore only, the first FDR151 message will identify the dataset which contains that track.

**Action:** FDR will continue the restore operation. This track will be bypassed. See "DISK I/O ERRORS" in [Section 52.10](#) for help in understanding the error. Contact INNOVATION for technical assistance.

Note: If this is a logical restore and you also received an FDR138 REASON=9, then refer to the instructions in the Action part of the FDR138 Message.



**FDR152 ICF VSAM ERROR REASON=x DSN=cluster/component VOL=vvvvvv**

**Reason:** An I/O error or logical error exists within the SYS1.VVDS data set or in the VVDS information for the cluster or component indicated, on volume "vvvvvv" (this error may also occur for non-VSAM data sets on SMS-managed volumes). On a restore, FDR compares the characteristics of the cluster on the backup file with those of the cluster being restored to on disk; if some required characteristic does not match, this message details that mismatch. The VVR/NVR from the backup and the disk will be printed for certain types of errors.

REASON CODE	EXPLANATION
1	– ICF VSAM clusters exist on the volume, but FDR failed to find the SYS1.VVDS data set on the output disk or on the backup file. The VVDS may not exist or FDR encountered an error trying to find it. The IOB details the error.
2	– The number of extents in the SYS1.VVDS data set was zero.
3	– The SYS1.VVDS contains more than 3 extents. FDR had an I/O error or logical error finding the Format 3 DSCBs. The IOB details the error.
4	– An I/O error or logical error was detected when FDR read or wrote entries within the SYS1.VVDS data set, or the VVDS contains no active records (even though there are ICF clusters on the volume). For an I/O error, the IOB details the error.
5	– The length of a VVR/NVR entry within the VVDS is negative.
6	– The length of all of the VVR/NVR entries within a block of the VVDS exceeded the length in use within the block.
7	– A VVDS record indicates that the length of its in-use data exceeds 4096.
8	– An error occurred when DSF attempted to find one of the associated components for this cluster. The component may be in the VVDS but not in the VTOC. The IOB details the error.
9	– FDR is unable to store all of the VSAM component and cluster names in its internal table. A large number of VSAM clusters must exist on the volume. Specify the keyword ICFCORE= on the DUMP TYPE= Statement or permanently increase the ICFCORE value in the FDR/ABR global option table.
A	– A cluster specifies a catalog name which was not found in the catalog entries stored in the first record of the VVDS.
B	– FDR could not find the volume information/allocation cell (type 23) in the VVR record, or an individual cell had an invalid length.
C	– More than one SYS1.VVDS data set found on the volume. The operating system will use the VVDS which contains the current disk volume serial number in the name. More than one VVDS can be created if a volume with a VVDS is renamed and a VSAM cluster is allocated using the volume with the new serial number. If the VVDS with the incorrect volume serial does not have any current clusters cataloged within it, use SUPERZAP to turn off the PASSWORD indication in the DSCB and scratch the data set using IEHPRGM. A U0634 abend will be issued, so no VSAM restores can be done to this volume until the condition is corrected.
G	– The imbedded index VVR (Type Q) was not found.
H	– The size of an extent was not a multiple of the CA size; or the high RBA of an extent exceeded the maximum.
I	– The control interval size (CISIZE) on the backup cluster does not match the cluster on disk. The displacement is X'16' (See Note 1).
J	– The number of CIs per CA on the backup cluster does not match the cluster on disk. The displacement is X'0E' (See Note 1).
K	– The space allocation unit (TRACK vs CYL) on the backup cluster does not match the cluster on disk. The displacement is X'10' (See Note 1). This error is also issued following a FDR160 message; see FDR160.
L	– The physical blocksize or number of blocks per track on the backup cluster does not match the cluster on disk. The displacement is X'11' or X'15' (see Note 1).
M	– The number of tracks per CA on the backup cluster does not match the cluster on disk (Check the secondary allocation value specified). The displacement is X'17' (see Note 1).
N	– The VSAM cluster is being restored to a different type of cluster. EXAMPLE: KSDS to an ESDS. Register 0 contains the type field from the backup. The bits have the following meanings (more than one bit may be on, all must match): X'80' - Key Sequence (KSDS)    X'20' - Imbedded Index (IMBED)    X'02' - Relative Record (RRDS) X'10' - Replication (REPLICATE)    X'04' - Key Range If neither X'80' nor X'02' is on, the cluster is an ESDS (entry sequenced) or LDS (Linear) cluster. The displacement is X'03' (see Note 1).
O	– The length of the VVR/NVR exceeds the length of the cells within the VVR/NVR.
P	– On a key range cluster, the high key length is different from the low key length. The displacements are X'24' and X'26' (See Note 1).
Q	– On a key range cluster, the high key range length on the backup cluster does not match the cluster on disk. The displacement is X'26' (See Note 1).
R	– The backup cluster does not contain a key range while the disk cluster does. The displacement is X'24'.
S	– The backup cluster contains a key range while the disk does not. The displacement is X'24' (see Note 1).
T	– A VVR entry in the VVDS contains a cell type other than a 21, 23 or 60.
U	– The type of VVR entry on the backup does not match the disk (Z record being restored to Q). The user may be attempting to restore a multi-volume data component to the wrong sequence component, or attempting to restore a cluster created by DFP V2 to a cluster on disk allocated by DFP V1 or DF/EF.
V	– The total length of a VVR/NVR record does not match the sum of the lengths of the cells within it, on the output disk.

**FDR152 CONTINUED. . .**

- W – The total length of a VVR/NVR record does not match the sum of the lengths of the cells within it, on the backup file.
- X – The number of extents specified in the VVR record does not match the DSCB entry in the VTOC for a component.
- Y – A base cluster is being restored to an alternate index or vice versa.
- Z – Internal Error – The length of the FDR backup file control block for VSAM was less than the sum of the lengths of the VVRs/NVRs within it.

**Action:** During a dump, the cluster/component indicated (or all clusters if SYS1.VVDS.Vvvvvv is the name printed) may not be restorable. A FDR MINI-DUMP may be printed to help diagnose the error. During a restore, the cluster or component indicated will not be restored (it is possible for one component to be restored without error while another fails, but the cluster will not be usable). For I/O errors, a MINI-DUMP will be printed showing the I/O results. Errors resulting from a comparison of the characteristics of the cluster being restored compared to cluster on disk are actually not detected until the restore is complete; the data tracks have been restored but the cluster is probably not usable. A MINI-DUMP will be printed showing the VVRs from the backup file and from the output disk; see Note 1. If restoring to a pre-allocated cluster, it was not defined with the characteristics that FDR requires to restore; in most cases, simply delete the cluster and let FDR define it properly. Some errors can occur even if FDR allocates the cluster. Contact INNOVATION for assistance if the error cannot be corrected. See VSAM Special Considerations ([Section 52.11](#)).

Note 1: On these reason codes, FDR will print a MINI-DUMP displaying the VVR (Vsam Volume Record) from the backup file and from the cluster on disk. In the registers at the top of the dump, register 14 points to a cell within the disk VVR and register 15 points to a cell within the backup VVR. Those registers plus the hex displacements shown above for the appropriate reason codes will point to the fields which did not compare. Definition of these fields are found in the IBM manual CATALOG DIAGNOSIS REFERENCE (Note: this manual does not exist in DFP/ MVS V3 and above, and has not been replaced).

**FDR153 VSAM SCRATCH ERROR COMP=cccc CODE=code CLUSTER=cluster**

**Reason:** FDR attempted to scratch an ICF VSAM cluster. The CATALOG DELETE SVC failed. COMP matches the return code and CODE matches the reason code as documented for message IDC3009I in the IBM System Messages manual.

Some commonly occurring codes are:

**COMP CODE**

- 0008 0042 – The cluster to be scratched was not cataloged.
- 0076 0000 – User attempted to scratch a multi-volume cluster which was not aliased and a STEPCAT was not present for the catalog. This data set may be partially deleted.
- 0076 0008 – User attempted to scratch a cluster with an alternate index on another volume.
- 0084 0000 – The VSAM cluster is date protected.

Specify VEXPD=NONE on the DUMP Statement to scratch this cluster.

COMP values over 9000 are from FDR:

**COMP**

- 9004 – Dynamic allocation failed for the specified cluster. CODE is the decimal equivalent of the dynamic allocation error code; the code appears in hex in register 14 within the minidump. Dynamic allocation error codes are documented in the ISPF tutorial appendix, and in the IBM manuals SPL: JOB MANAGEMENT for MVS, SPL: SYSTEM MACROS AND FACILITIES and SPL: APPLICATION DEVELOPMENT GUIDE for MVS/ESA.  
  
In particular, a dynamic allocation error code of decimal 5896 or X'1708' indicates that the input cluster was not found in the catalog. If the cluster is not aliased in the master catalog, you should supply a STEPCAT DD statement.
- 9008 – User attempted to archive or move a multi-volume VSAM cluster. The components on this volume were dumped and recorded in the archive control file, or were copied to the output volume, but were not scratched. If all of the associated components have been dumped or copied, the user can use SUPERSCRATCH or IDCAMS to scratch the cluster.
- 9012 – Internal Error – The TIOT search failed to find the disk DD name to which the cluster was dynamically allocated.
- 9016 – FDR cannot scratch an ICF VSAM cluster on a non-MVS system.
- 9020 – A KSDS with alternate indexes has been archived but it was not scratched because ALTINDEX=NO was specified.
- 9024 – Cluster cannot be scratched because it is cataloged to a different volume.
- 9028 – Cluster cannot be scratched because it is cataloged as non-VSAM or cataloged to more than 20 volumes.

**Action:** Check the error code and correct if necessary. A FDR MINI-DUMP will be printed displaying the CATALOG DELETE parameter list and the catalog name. If desired, contact INNOVATION for assistance.

**FDR155   nnnnn TRACKS MISSING ON RESTORE OF DSN=dsname**

**Reason:** Data set restore detected that a number of expected tracks were not found during the restore of the data set named. The remainder of the data set was restored, but it may be unusable. The cause may be:

1. The restore specified DATA=ALL, but the backup used DATA=USED.
2. The restore used LBPZERO=INVALID, but the backup used LBPZERO=VALID.
3. Backup file errors (message FDR200) were reported during the backup or restore.
4. A disk error occurred during the backup which required tracks or cylinders to not be recorded on the backup file (e.g., message FDR123 or FDR129). Message FDR150 will also be printed during the restore.
5. Blocks were lost from the backup file due to unreported tape drive errors.
6. The restore abended before processing all of the backup file.

**Action:** If the cause cannot be determined, contact INNOVATION for assistance.

**FDR156   ALLOCATE FAILED FOR nnnnn   CYL | TRK   COMP=X'code-reason' VOL=vvvvvv DSN=dsname****FDR156   ALLOCATE FAILED FOR CATALOG COMP=cccc CODE=reason VOL=vvvvvv DSN=dsname**

**Reason:** FDR attempted to allocate a non-VSAM data set on volume "vvvvvv" and the attempt failed (if FAILED FOR CATALOG is displayed, the allocation was successful, but a later attempt to catalog the data set failed). "code" is the return code from allocation, and "reason" is the reason code (when available); both are in hex except as indicated below. If the allocation was attempted on multiple volumes (because of the NVOL= operand or the ABR RESTORE ALLOCATION LIST), it failed on all of them, but "vvvvvv" is the first volume on which it was tried, and COMP is the code from that volume. On a system with SMS active, if the data set is SMS-managed, "vvvvvv" is the volume that FDR selected for the data set and may not be the same as the volume on which SMS tried to allocate it.

COMP may be codes from the IBM ALLOCATE SVC (SVC 32), from the IBM CATALOG SVC (SVC 26), from the IBM SMS interface, or internal diagnostic codes from FDR itself.

If FAILED FOR CATALOG is displayed, "cccc" is the return code and "reason" is the reason code from CATALOG, in decimal. They are documented in the IBM SYSTEM MESSAGES manual under message IDC3009I. Some of the common codes shown under message FDR157 also apply to this message.

Otherwise, if "code" is a value less than X'1000', it is from ALLOCATE, in hex. These codes can be found under REALLOC in the IBM manuals SPL: DATA MANAGEMENT for DFP V1 and SYSTEM DATA ADMINISTRATION for DFP V2, or under DADSM CREATE RETURN CODES in the manual DFP DIAGNOSIS REFERENCE for DFP V3 (For V3, "return" may be a 8-digit hex diagnostic code, documented in the DFP DIAGNOSIS REFERENCE under "DADSM CREATE DIAGNOSTIC INFORMATION"). Common codes include:

**CODE**

0004 – Duplicate Data set name in VTOC

0008 – VTOC or Indexed VTOC is full

0010 – Requested absolute tracks not available

0014 – Requested space quantity not available

00AC – No security authorization to create data set

00B4 – IGGPRE00 Installation exit rejected the request. A local exit or DASD Control software product has disallowed allocation on the volume that FDR selected.

Other codes are from FDR, as follows:

**CODE**

2354– NEWNAME=, NEWGROUP=, or NEWINDEX= was specified and it resulted in a data set name not meeting IBM's naming standards.

FDxx– On a system with SMS active, the IBM subsystem interface (IEFJSREQ) failed with return code "xx"

FExx– On a system with SMS active, the IBM SMS interface failed the allocation request with return code "xx", which is defined in the IBM manual DFP DIAGNOSIS REFERENCE under "SMS SUBSYSTEM INTERFACE RETURN CODES" "reason" will be the SMS reason code, in decimal, documented in the same manual under "SMS REASON CODES" (and can also be found in the IBM SYSTEM MESSAGES manual by looking up message IGDxxxxx (xxxxxx is the reason code).

FF04– FDR cannot allocate an ISAM file. See ISAM member in ICL Library.

FF08– FDR cannot allocate a non-ICF VSAM file.

FF0C– FDR cannot allocate an unmovable file with more than 1 extent.

FF10– FDR cannot allocate a ICF VSAM file on a non-MVS system.

FF18– On a COPY/MOVE of a data set protected by a discrete RACF profile, an attempt to issue RACDEF to define a profile for the output data set failed. "reason" will be "0000xyy" where "xx" is the RACF return code and "yy" the RACF reason code ("xx" of 04 indicates that the profile already exists, 08 that the user is not authorized to create the profile.

FF50– GETMAIN failure during allocation. Increase the region.

FF51– Allocation parameter list error. Contact INNOVATION.

FF52– UCB address not passed or invalid. Can occur if the data set is *not* SMS-managed (no storage class assigned), but DSF/ABR has not selected a volume on which to allocate it. Specify NVOL= and rerun.

**FDR156 CONTINUED . . .**

- FF53– NVR is not cell type N. Contact INNOVATION.
- FF54– NVR cell type not 22. Contact INNOVATION.
- FF55– NVR type 24 cell length invalid. Contact INNOVATION.
- FF56– NVS SMS subcell not type 24. Contact INNOVATION.
- FF57– DSCB address not passed. Contact INNOVATION.
- FF58– The selected output disk volume was SMS-managed, but no storage class was assigned. Specify STORCLAS= or select a non-SMS volume, and resubmit.

**Action:** Determine the cause and take appropriate action. It may be possible to circumvent the problem by pre-allocating the output data set. If needed, contact INNOVATION for assistance.

**FDR157 VSAM ALLOCATION ERROR COMP=cccc CODE=reason VOL=vvvvvv CLUSTER=cluster name**

**Reason:** FDR attempted to allocate an ICF VSAM cluster, using the IBM CATALOG SVC (SVC 26), but the attempt failed. "cccc" is the return code and "reason" is the reason code from CATALOG, in decimal, or is a value generated by FDR itself). If the allocation was attempted on multiple volumes (because of the NVOL= operand or the ABR RESTORE ALLOCATION LIST), it failed on all of them, but "vvvvvv" is the first volume on which it was tried, and the codes are from that volume. On a system with SMS active, if the cluster is SMS-managed, "vvvvvv" is the volume that FDR selected for the cluster and may not be the same as the volume on which SMS tried to allocate it. Codes from the IBM CATALOG SVC can be found in the IBM SYSTEM MESSAGES manual under message IDC3009I. Common codes include:

- | <b>CODE</b> | <b>REASON</b>  |
|-------------|--|
| 0004        | 0010– The ICF catalog selected by FDR to catalog this cluster does not exist (see the description of the ICFCAT= operand).   |
| 0008        | 0008– Name already in the catalog. A NEWGROUP= or NEWINDEX= value may have resulted in renaming the output cluster or some of its components to the same name.   |
| 0008        | 0038– Name already in the catalog. Either the cluster or component name already exists, or the original cluster is still cataloged. The VRECAT operand can be used on the RESTORE statement to delete the duplicate names. |
| 0056        | 0006– Insufficient security authorization to define the cluster.   |
| 0068        | 0008– The VTOC or Indexed VTOC is full.  |
| 0068        | 0020– Insufficient space available to define the cluster.  |
- If "code" is a value above 9000, the error is generated by FDR itself (COMP values from 9052 through 9080 may occur if the cluster being restored had an imbedded index, and at the time of the backup the index component was in multiple extents):
- 9004 – The VVR entry for the data component on the backup contains a cell type other than a 21, 23 or 60.
  - 9012 – FDR cannot allocate a multi-volume data component.
  - 9016 – The VVR entry for the index component on the backup contains a cell type other than a 21, 23 or 60.
  - 9020 – FDR is attempting to allocate a KSDS cluster, but could not locate the index component on the backup. This may be a multi-volume cluster.
  - 9024 – SELECT specified a component name instead of cluster name, or a component of the requested cluster was missing from the VVDS at the time of the backup, or ICF=IGNORE or DFEF=IGNORE was specified during the dump.
  - 9028 – FDR could not find the type 23 cell in the VVR.
  - 9032 – FDR cannot allocate a VSAM cluster which contains a alternate index to a NEWNAME. Use NEWGROUP or NEWINDEX instead of NEWNAME.
  - 9036 – FDR cannot allocate a VSAM cluster with key ranges using NEWNAME=. Use NEWGROUP= or NEWINDEX= instead of NEWNAME=.
  - 9040 – The volume serial number in the SYS1.VVDS data set does not reflect the volume it is on. If FDR were to allocate an ICF VSAM cluster under these conditions, the operating system would create a new VVDS data set.
  - 9044 – NEWNAME=, NEWGROUP= or NEWINDEX= was specified which resulted in the cluster, component names or the original name not meeting IBM's data set naming standards.
  - 9048 – Error occurred applying the NEWINDEX= value.
  - 9052 – A LOCATE failed. CODE shows the return code from LOCATE. The reason code is not shown.
  - 9056 – Unable to find the PCCB for a user catalog.
  - 9060 – Dynamic allocation failed. CODE shows the return code in register 15 from SVC 99. The dynamic allocation return code (DARC) from the SVC 99 parameter list is not shown.
  - 9064 – VSAM OPEN failed. Message IEC1611 may appear on the job log. CODE shows the return code from VSAM OPEN, as documented under message IEC1611 in the IBM SYSTEM MESSAGES manual. For example, code 0040 indicates a security violation.

## FDR157 CONTINUED . . .

- 9068—VSAM PUT failed. CODE shows the return code from VSAM PUT.
- 9072—AMB Extension was not found. 9076 — Internal error in reconstructing the imbedded index RBA of index extent is not correct.
- 9080—VSAM EOVS failed. Message IEC0701 may appear on the job log. CODE shows the return code from VSAM EOVS, as documented under message IEC1611 in the IBM SYSTEM MESSAGES manual. For example, code 0104 or 0209 indicates that the volume that you were restoring to did not have enough space to contain the data set. It should be possible to restore the cluster to another volume with more space available.
- 9084—Error from RACF, for a cluster with a discrete profile. FDR successfully allocated the cluster, and then tried to define a new discrete profile, using the profile of the original cluster as a MODEL. The CODE value is the RACF return code, and register 0 within the minidump contains the RACF reason code. A CODE of 4 indicates that the profile already exists, 8 indicates the user is not authorized to create the profile.
- 9088—A KSDS with an excessive number of key ranges cannot be defined.
- 9092—A PAGE/SWAP cluster cannot be copied or moved to the same name (NEWNAME=, NEWGROUP=, or NEWINDEX= must be used).
- 9093—CISIZE of input cluster is invalid for logical restore.
- 9094—Physical blocksize of input cluster is invalid for logical restore.
- 9095—CASIZE of input cluster will not fit in a cylinder of the output disk for logical restore.
- 9096—Allocation of a multi-volume VSAM cluster failed. REASON indicates the specific error:
- 0004 — GETMAIN/FREEMAIN error 0008 — Volume list from LOCATE is invalid
  - 0012 — Non-VSAM catalog entry invalid
  - 0016 — Unable to obtain LOCAL lock
  - 0020 — Type 23/21 cell not found in VVR
  - 0024 — Cluster on more than 10 volumes
  - 0028 — Number of extents does not match Type 60 cell
  - 0032 — UCB not found for output disk
  - 0036 — Imbedded index extents do not match
  - 0040 — Length error on cluster/component name
  - 0044 — VVR length invalid
  - 0048 — NEWNAME= not supported (use NEWG/NEWI)
  - 0052 — Catalog entry type not non-VSAM
  - 0056 — LOCATE error
  - 0060 — Cluster has alternate index
  - 0064 — VRECAT failed
  - 0068 — Cluster has over 123 extents on a volume
  - 0072 — Number of extents on volume not correct
  - 0076 — Unlike device restore not supported
  - 1xxx — OBTAIN error (xxx is OBTAIN error code)
  - 2xxx — DYNAMIC ALLICATION error (xxx is allocation error code)
  - 3xxx — EXTENT error (xxx is EXTEND error code)
  - 3129 — Insufficient space for component on this volume
- 9100—The selected output disk volume was SMS-managed, but no storage class was assigned. Specify STORCLAS= or select a non-SMS volume, and resubmit.
- 91xx—On a system with SMS active, the IBM SMS interface failed the allocation request with return code "xx", which is defined in the IBM manual DFP DIAGNOSIS REFERENCE under "SMS SUBSYSTEM INTERFACE RETURN CODES". "reason" will be the SMS reason code, in decimal, documented in the same manual under "SMS REASON CODES" (and can also be found in the IBM SYSTEM MESSAGES manual by looking up message IGDxxxxx (xxxxx is the reason code)).
- 92xx—On a system with SMS active, the IBM subsystem interface (IEFJSREQ) failed with return code "xx".
- 9450—GETMAIN failure during allocation. Increase the region.
- 9451—Allocation parameter list error. Contact INNOVATION.
- 9452—UCB address not passed or invalid. Can occur if the data set is *not* SMS-managed (no storage class assigned), but DSF/ABR has not selected a volume on which to allocate it. Specify NVOL= and rerun.
- 9458—BYPASSSMS was specified and the selected output disk volume was SMS-managed, but no storage class was assigned. Specify STORCLAS= or select a non-SMS volume, and resubmit.
- 9459—Volsers in CPL cannot be located, or over 10 volumes passed. Contact INNOVATION.

**Action:**

Determine the cause and take appropriate action. For errors involving names already in the catalog, the VRECAT operand on the RESTORE statement may be used to DELETE the duplicate names from the catalog (but should be used cautiously since it may DELETE other clusters). If desired, contact INNOVATION for assistance.

**FDR158 DATA SET ENQ FAILED DSN=dsname**

**Reason:** The user specified the data set enqueue option (DSNENQ=). This data set could not be enqueued because some other job or user currently has the data set enqueued.

**Action:** FDR – the data set will be dumped.  
 COMPAKTOR – the data set will be dumped but it will not be restored or moved during the COMPAKTion.  
 DSF or ABR DUMP – the data set will be dumped.  
 DSF or ABR RESTORE – the data set will not be restored.  
 FDRCOPY – the data set will not be copied/moved.  
 ARCHIVE or SUPERSCRATCH – the data set will be bypassed.  
 Other than on FDR and COMPAKTOR, the above can be overridden using ENQERR=PROCESS or ENQERR=BYPASS.

An ABEND or non-zero condition code will be issued at the end of the DUMP or RESTORE Operation except for COMPAKT, ARCHIVE or SUPERSCRATCH. Specifying ENQERR=NO will suppress the ABEND or non-zero condition code caused by an ENQ failure.

**FDR159 UNABLE TO RESTORE REASON=x DSN=dsname**

**Reason:** FDR is unable to restore the named data set for the reason specified. The data set will be bypassed.

REASON CODE	EXPLANATION
-------------	-------------

- |   |  |
|---|--|
| 1 | – An ICF VSAM catalog or SYS1.VVDS data set cannot be restored to a newname.   |
| 2 | – The SYS1.VVDS was selected without PROT=NONE specified on the RESTORE TYPE=DSF Statement.  |
| 3 | – The SYS1.VVDS or SYS1.VTOCIX data set or the ABR model DSCB (FDRABR.Vvvvvv) was selected using ALLDSN or DSG. DSF or ABR will bypass the restore of the VVDS, VTOC index, or ABR model. These data sets are internally updated by DSF or ABR during a restore to reflect what was restored, so it is almost always a mistake to try to restore them as data sets. This message is only a warning message; it will not cause an ABEND or non-zero condition code to be issued. If the VTOC index is damaged, the best way to recover is usually to rebuild it by using the BUILDIX command of program ICKDSF. To rebuild the ABR model DSCB use the REMODEL command of program FDRABRM ( <a href="#">Section 55.05</a> ). |

**Action:** Correct if this is an error.

**FDR160 UNABLE TO RESTORE – INDEX HAS INCORRECT EXTENT SIZES – CLUSTER=cluster name****FDR160 SCRATCH THE CLUSTER AND TRY THE RESTORE AGAIN LETTING FDR ALLOCATE IT FOR YOU. MESSAGE FDR152 REASON=K FOLLOWS.**

**Reason:** The VSAM cluster that was backed up, or the input VSAM cluster for the copy or move, had an imbedded index, and had an index component that was in multiple extents. In order to do the restore or copy or move, the output cluster must have the same arrangement of extents as the original cluster. However, the output cluster was found to exist on disk before the restore or copy or move, with a different arrangement of extents. There is no practical way for the user to DEFINE the output cluster with the correct arrangement of extents.

**Action:** DELETE the version of the cluster that you have tried to DEFINE, and let the restore or copy or move do the allocation. Then the restore or copy/move will automatically rebuild the cluster with the original arrangement of extents.

**FDR161 XMS ERROR REASON=x**

**Reason:** Under DFP V2.2 or above, FDR was unable to find module IGG0CLX0 in the Catalog Address Space (CAS) using Cross Memory Services (XMS). The reason codes document various internal errors.

**Action:** Contact INNOVATION for assistance.

**FDR169 SMS NVR RECORD ERROR REASON=1**

**Reason:** On a SMS-managed volume, the NVR (Non-Vsam Record) in the VVDS had a length exceeding 256 bytes.

**Action:** Contact INNOVATION for assistance.

**FDR200 BLOCK DROPPED--(synadaf info)--(data block)**

**Reason:** A permanent BSAM read or write I/O error has occurred on a backup data set. The cause of the error is documented as "synadaf info" as provided by the IBM SYNAD EXIT. "data block" is the first 20 bytes of backup data block, if available. An IBM IEA000I or IOS000I I/O error message may also appear in the job's JOB LOG. "TAPE I/O ERRORS" in [Section 52.10](#) gives more details.

**DUMP PROCESSING:** If on reel tape (not cartridge), FDR issues an EOVS to force a new output reel to be mounted. The blocks which were being written to the tape having the error will be rewritten as the first blocks on the new reel. If this tape switch occurs more than 20 times, FDR will terminate with a U0200 abend. On 3480 cartridges, because of the 3480 tape buffer, FDR will issue the U0200 abend immediately after the first unrecoverable tape error. FDR will also terminate immediately if the error occurs during the write of the control records at the beginning of the backup.

**RESTORE PROCESSING:** Any block in error is bypassed. If the error is due to I/O errors during the dump, the block in error was rewritten on the next tape volume; if it is read successfully the data will be properly restored (Logical data set restore may fail on this condition). FDR will drop up to 20 blocks before terminating with a U0200 abend. If any track images were never successfully read from any tape volume, Message FDR366 (and possibly Message FDR155) will be issued to document this; if neither is issued then the restore was successful despite the I/O errors.

The block number in the (synadaf info) will indicate the tape block dropped. MAXERR= can increase or decrease the number of errors FDR will bypass. The keyword TAPERCD=NO will suppress the condition code or abend that occurs at the end of the dump or restore.

Note: SWAP should not be used. [See Section 52.10](#) for further details.

**SAR WARNING:** If FDR drops and rewrites a block during dump operations, SAR may fail reading the bad block.

**NOTE:** INNOVATION offers two products which can dramatically reduce tape errors: FATS (FAST ANALYSIS OF TAPE SURFACES) will analyze tapes for defective areas and FATAR (FAST ANALYSIS OF TAPE AND RECOVERY) will display and correct data on data checked tapes.

**FDR201 FORCE END OF VOLUME TAKEN--BLOCK WILL BE REWRITTEN**

**Reason:** During dump processing a tape I/O error caused a tape volume switch to occur. See Message FDR200 for details. If BSAM caused the volume to switch during error recovery before FDR was able to force the EOVS, this message will not be issued.

**FDR203 PREMATURE TAPE END OF FILE DSN=dsname**

**Reason:** FDR detected an end-of-file on the backup tape without encountering the FDR trailer identification record. The dump may not have succeeded. On a FDR full volume or data set restore, FDR will ABEND with a U0201. The following possible causes are:

- The backup that created this file did not complete successfully.
- The backup run completed successfully, but the backup file was not correctly cataloged.
- The JCL for the restore specifies volume serial numbers for the backup file, but the last volume has been omitted, or the volume serials are out of order.

**Action:** In the last two cases, you can do the restore by specifying the correct volume serial numbers on the DD statement for the backup file.

**FDR204 TAPE BLOCK LENGTH CHECK--BLOCK BYPASSED**

**Reason:** FDR stores the length of the block written in the first two bytes of the block. The length of the block read did not match the length stored in the first two bytes. An FDR MINI DUMP is printed.

**Action:** FDR will continue processing bypassing this block. One or more tracks of data may have been lost. Message FDR366 will detail the tracks lost, if any.

If Message FDR204 occurs many times, the cause is probably that you are restoring from a tape that was created by using a utility program (such as IEBGENER) to copy an FDR backup file. Most utilities cannot copy FDR backup tapes. FDRTCOPY or FATAR (Ver. 4.0) must be used to copy FDR backup tapes.

**FDR205 TAPE BLOCK CROSS-CHECK ERROR**

**Reason:** FDR encountered an error deblocking one of the tape blocks into track and disk block images. A MINI DUMP is printed.

**Action:** A U0204 Abend is issued if MAXERR= errors is exceeded.

**FDR206 TAPE BLOCK COUNT ERROR**

**Reason:** The number of blocks read from the tape did not match the block count in the tape trailer label. A MINI DUMP is printed of the DCB and registers. The registers are from the block count exit. Register zero (0) contains the block count from the trailer label, which reflects the number of blocks written during the backup run. The fourth word of the DCB contains the count of blocks read during the restore.

**Action:** FDR will ignore the error and continue processing. If tracks necessary to do the restore are lost, FDR will detail same in Message FDR366.

**FDR207 TAPE CROSS-REFERENCE TABLE IS MISSING DSN=dsname**

**Reason:** FDR could not find the track table on the backup volume. This backup may have been created prior to Ver. 4.5.

**Action:** The cross-reference check will not be made (Message FDR366).

**FDR270 FDRCONVT OPTIONS IN EFFECT:**

**Reason:** Issued to indicate the options in effect.

**FDR271 VOLUME CONVERSION RESULTS SUMMARY:  
SIMULATION**

VOLSER vvvvvv	FINAL STATUS status	STORGRP storgrp name	REASON FOR FAILURE reason or blanks
------------------	------------------------	-------------------------	--

**Reason:** Issued to document the results of conversion for each volume processed. This message may be issued twice, once for volumes specified in the VOL= parameter and again for volumes dynamically allocated due to 'MULTIVOL=YES'. FINAL STATUS indicates the status of the volume at completion of conversion. REASON FOR failure will indicate why the volume could not be converted, or blanks if conversion was successful.

**FDR273 VOLUME vvvvvv ASSIGNED TO STORGRP=storgrp name**

**Reason:** Issued to indicate the SMS storage group assigned to a disk volume being processed. If no storage group is assigned, the storgrp name is 'NO STORG'. If the storage group was never determined, the storgrp name is '????????'.

**FDR274 VOLUME CONVERSION COMPLETED SUCCESSFULLY FOR VOLUME=vvvvvv  
SIMULATION FAILED VOLUME=vvvvvv**

**Reason:** Indicates whether volume conversion or simulation was successful for the specified volume.

**Action:** If conversion or simulation failed, determine the reason for failure and rerun the job.

**FDR275 VOLUME CONVERSION BEGINS FOR VOLUME=vvvvvv  
SIMULATION**

**Reason:** Indicates that conversion has begun for the specified volume.

**FDR276 DSNAME= dsn CONVERTED TO SMS**

CLUSTER=	CONVERTED TO NONSMS ALREADY CONVERTED TO SMS ALREADY CONVERTED TO NONSMS
VOLUMES=vvvvvv vvvvvv vvvvvv	NOT ELIGIBLE
CATALOG=catalog name	NEWCAT=new catalog name
STORCLAS=storage class name	MGMTCLAS=management class name

**Reason:** Specifies status and processing for a data set or an ICF VSAM cluster. If the data set or cluster was already in the desired status 'ALREADY CONVERTED' is indicated. The catalog name and storage and management class names are shown. If the data set was catalogued or recatalogued in the standard order of search, the new catalog name is shown. For multivolume data sets, the volumes on which the data set is cataloged are shown. If the data set could not be converted, Message FDR277 is also issued.





**FDR283 NO VOLUMES TO PROCESS**

**Reason:** No volumes were online that met the specification in the VOL= parameter. FDRCONVT has nothing to do.  
**Action:** Specify the correct volumes to be processed in the VOL= parameter.

**FDR286 MASTER CATALOG NAME NOT FOUND**

**Reason:** The name of the master catalog could not be determined. FDRCONVT must determine the master catalog name in order to run.  
**Action:** Correct any problems with the master catalog and rerun the job. If the problem cannot be determined, call INNOVATION for technical assistance.

**FDR287 ATTACH ERROR**

**Reason:** FDRCONVT could not successfully attach a required subtask.  
**Action:** If the problem cannot be determined from the dump, call INNOVATION for technical assistance.

**FDR288 LOCATE ERROR FOR INCAT CATALOG=catalog name**

**RETURN CODE=retcode REASON CODE=reason**

**INCAT CATALOG NOT FOUND**

**INCAT CATALOG NOT ICF CATALOG**

**INCAT CATALOG NOT A USER CATALOG**

**Reason:** FDRCONVT encountered an error while trying to find a catalog specified in the INCAT parameter. The return code and reason code are the same as documented for Message IDC3009I in the IBM System Messages manual.  
**Action:** Correct the error. Specify the correct catalog if necessary. Contact INNOVATION for technical assistance if required.

**FDR289 ERROR OBTAINING *STORCLAS* | *MGMTCLAS* | *DATACLAS* DEFINITIONS  
R15=nnnnnnnn, SFN=fn, RETN=rrrrrrr, RSN=sssssss**

**Reason:** FDRCONVT was unable to obtain the definitions for SMS classes. R15 contains the return code from the SMS subsystem call. 'fn' is the SMS SSOB subfunction code. 'rrrrrrr' and 'sssssss' are the SMS return code and reason codes. The codes can be found in the IBM DFP Diagnosis Reference.  
**Action:** Correct the error. Contact INNOVATION for technical assistance if necessary.

**FDR290 CONVERTVOL FACILITY CLASS NOT AUTHORIZED  
INCAT**

**Reason:** The authorization check for the specified RACF FACILITY class resource failed.  
**Action:** Insure that the job has authority to the required RACF resources.

**FDR291 INCATNAME PARAMETER IGNORED – CATLG=YES NOT SPECIFIED**

**Reason:** The INCAT parameter was specified without CATLG=YES when converting to SMS management. SMS-managed data sets must be catalogued in the catalog to which their high-level qualifier(s) are aliased.  
**Action:** Recatalog the data sets to the correct catalog or specify CATLG=YES and rerun the job.

**FDR292 INVALID DSN/DSG NAME**

**Reason:** The DSN or DSG parameter did not begin with an alphameric or national character. The special form of the DSN or DSG parameter beginning with a period is not allowed with FDRCONVT.  
**Action:** Revise the DSN or DSG parameter and rerun the job.

**FDR293 THRESHOLD PERCENT: LO=ll, HI=hh, PERCENT OF VOLUME IN USE=pp**

**Reason:** The high and low ALLOCATION/MIGRATION THRESHOLD values for the storage group to which this volume is assigned are displayed as well as the percentage of the disk volume that is in use.

**FDR294 FDRKWDPR INTERNAL ERROR**

**Reason:** An internal error was encountered while processing control statements.  
**Action:** Contact INNOVATION for assistance.

**FDR295 INSUFFICIENT STORAGE**

**Reason:** Insufficient main storage was available for FDRCONVT to process all data sets on the volume.  
**Action:** Increase the region size and rerun the job. If there are a large number of ICF VSAM components on the volume, increase the ICFCORE value.

**FDR296 WARNING: SPACE USED ON VOLUME EXCEEDS STORGRP THRESHOLD**

**Reason:** The percentage of the volume in use exceeds the upper value of the ALLOCATION/MIGRATION THRESHOLDS when converting to SMS management. The operating system may avoid allocating to this volume until the percentage of space used is decreased.  
**Action:** Move data sets off of the volume until the percentage of the volume in use is less than the THRESHOLD value.

**FDR297 UNKNOWN PARM: parm**

**Reason:** An unrecognized parameter was specified on a control statement.  
**Action:** Specify a valid parameter.

**FDR298 REQUIRED PARM parmname MISSING**

**Reason:** A required parameter was not found on a control statement.  
**Action:** Supply the missing parameter.

**FDR299 VOLUME vvvvvv NOT FOUND**

**Reason:** Volume vvvvvv specified in the VOL= parameter was not found on the system.  
**Action:** Specify the correct volume and rerun the job.

**FDR301 FAST DUMP RESTORE STORAGE MANAGEMENT – FDRABR VER 5.2zaab – INNOVATION DATA  
PROCESSING DATE=yy.ddd PAGE nnn**

**Reason:** This is the ABR page heading, specifying the version level of ABR. "z" will be "/" for the base release, and will be a letter (e.g., "A") for subsequent releases. "aa" is a 2-digit number indicating the level of integrated maintenance. "b" will be "P" for a production version, "T" for a trial, and "B" for a beta test version.

**FDR302 CONTROL STATEMENT | ERROR NEAR REL LOCATION nn | - REASON x - JOB TERMINATED**

**Reason:** An error was encountered during the processing of a user-supplied control statement. If "NEAR REL LOCATION nn" appears, the keyword or operand causing the error is at or near column "nn" on the input statement.  
 The error is defined by the reason code within the message.  
 Note: The expression "SELECT-type COMMANDS" in these explanations refers to the SELECT and EXCLUDE commands for program FDRDSF and FDRCOPY and to the SELECT, EXCLUDE, MOUNT, PROFILE and PROTECT commands for program FDRABR.

REASON CODE	EXPLANATION
1	- A SELECT-type Command did not specify any operands. Control statement was blank after the Command name.
2	- Command on the first control statement was incorrectly specified; i.e.: was not DUMP, RESTORE, or PRINT (FDRDSF only) or COPY (FDR only) or SIM or SIMREST (FDRABR only).
3	- Operand on the first control statement was incorrectly specified. (Valid operands are TYPE=DSF, RESERVE, etc.).
4	- Operand did not end with a blank or comma.
5	- SYSIN data set was empty.
6	- Expected continuation statement was not found. The previous statement ended with a comma and a blank.
7	- a. On the first control statement, invalid or incompatible operands were specified. (Examples: RESERVE was specified but TYPE= was omitted, or FROM/TO was specified and TYPE= followed it.) b. The TYPE= operand was omitted on a command that requires it (such as PRINT or COPY). c. A control statement after the first was not a SELECT-type command. d. A SELECT-type command contained an invalid keyword. (Valid keywords are DSN=, VOL=, etc.).
8	- An operand on a SELECT-type Command specified a blank or comma after the equal sign.
9	- On the control statement printed above, one of the options exceeded the maximum number of bytes. The data set name exceeded 44 characters. The volume serial number exceeded 6 characters. The TAPEDD option exceeded 1 character. The NOTIFY operand exceeded 7 characters. The DD= or NEWDD= operand exceeded 8 characters. The ADATE= operand was not exactly 5 characters.
B	- The DD= or NEWDD= operand specified a ddname which did not appear in the JCL.
C	- Maximum number of SELECT-type Commands was exceeded. The number of SELECT-type Commands plus the number of commands in the PROTECT list was greater than the value specified in the MAXCARDS operand (default of 100 for ABR or 250 for FDRDSF).
D	- ADATE= operand did not specify numeric data.
E	- ADATE= operand exceeded 5 characters.
F	- An operand did not specify numeric data (Ex.: ADAYS=).
G	- An operand did not end with a blank or comma or exceeded 15 digits (Ex.: MAXCARDS=).
H	- ADAYS= operand resulted in a negative year.
I	- Keyword is invalid under the operation indicated. (Ex.: GEN= was specified on a DUMP operation. Check manual for allowable keywords under this operation).
J	- Control statement was completely blank.
K	- A required operand was not specified on the preceding SELECT-type statement. On RESTORE TYPE=FDR, VOL= was not specified. On all other operations DSN, DSG, DD, ALLDSN or FROM/TO was not specified.
L	- NEWG= began with a period.
M	- COPY operand specified other than 1 or 2 on the SELECT Command, DSORG specified an invalid value, or the data set specified by CATDSN= is cataloged on more than 20 volumes.
O	- The ONLINE(ONLVOL) keyword is not supported on RESTORE TYPE=FDR operation. In a non-MVS system, ONLINE(ONLVOL) is not supported for any restore operation. The UNIT operand was specified on a non-MVS system.
P	- ALLDSN was specified without ADATE on RESTORE TYPE=ARC. NEWN/G/I was specified with NEWNAME disabled. VOLG was specified on a RESTORE TYPE=ABR or TYPE=FDR.
Q	- Keyword exceeded maximum value or was negative (Ex: GEN=10000 or CYCLE=64).
R	- TYPE=xxx was specified multiple times.
S	- An operand on the SELECT-type Command was specified multiple times or was mutually exclusive with another operand. (Ex: DSN and DSG were both specified). DSN(G) was specified on a MOUNT command.
T	- The keyword BACKUP appeared on a SELECT Command read during a RESTORE TYPE=ARC operation, or the keyword ARCHIVE appeared on a SELECT Command read during a RESTORE TYPE=ABR operation. The keywords BACKUP and ARCHIVE should only appear on commands queued by program FDRABRUT on the ABRREST and ABRARCH data sets, respectively. Perhaps these two data sets were reversed.
U	- The TYPE=xxx operand was missing or invalid on the DUMP, RESTORE, COPY SIM or SIMREST Command. This operand is required for ABR or FDR (Ex: TYPE=FDR).
V	- An absolute track keyword was specified to FDRDSF (FROM/TO). The FROM/TO specification was in error. CYL and TRK did not specify numeric values or FROM value was higher than TO value, or absolute track operations have been disabled (NOABSTRK), or FROM/TO was specified on an EXCLUDE statement (DUMP only).

**Action:** Correct error and resubmit job.

- FDR303**    **CARD IMAGE—control statement image**                    **PROTECT LIST | ALLOC LIST | PARM ENTRY**
- Reason:**    Display all input control statements from the SYSIN data set. If 'PARM ENTRY' appears after the control statement, entry was passed from the PARM FIELD. If 'PROTECT LIST' appears after the control statement, entry was found in an ABR protect list. If 'ALLOC LIST' appears, the entry is from the ABR RESTORE ALLOCATION list.
- FDR304**    **ttt    RESTORE | DUMP    REQUEST FOR DDNAME=ddddddd,VOL=SER=vvvvvv,UNIT=uuuuuu**
- Reason:**    Describes the ABR operation that was performed and what volume was selected for processing. If ONLINE, ONLVOL, or MOUNT was specified, the DDNAME may be generated by ABR.  
 ttt=Type of operation.  
 FDR—Full Volume Backup/Restore.  
 ABR—Incremental Backup/Restore by data set.  
 DSF—Manual Backup/Restore by data set.  
 ARC—Archive data sets or Restore data sets from archive.  
 SCR—Superscratch.
- FDR305**                    **FROM | TO                    TAPE DDNAME=dddddd,DSNAME=cc...cc,FILE=fff,VOL=SER=vvvvvv,....**
- Reason:**    Describes the backup data sets used in the ABR Dump/Restore operation. The data set name, tape file sequence number (0 for disk), and disk or tape volser are displayed. If over 5 volumes are involved, several lines will be printed.
- FDR306**    **function SUCCESSFULLY COMPLETED (WITH DIAGNOSTIC MESSAGES)**
- Reason:**    The ABR operation described by the message has been completed. If WITH DIAGNOSTIC MESSAGES is printed, ABR detected diagnostic messages from the Dump/Restore subtask operation. Check the messages printed on the SYSPRINx data set.
- Action:**    If appropriate, contact INNOVATION technical support for assistance.
- FDR307**    **TAPE UNCATALOGED DSN=nnn...nnn**
- Reason:**    This operation was a full-volume backup, so it started a new generation. Therefore, ABR uncataloged the backup tapes from all cycles of the n'th prior generation, where n is the number of generations to be retained for this disk volume, as recorded in the ABR model DSCB on the volume. This value is specified by program FDRABRM or by the ABR ISPF dialogs.
- FDR308**    **CATALOG FAILURE FOR BACKUP [COND CODE=xx] [MAXIMUM VOLSERS EXCEEDED]**
- Reason:**    A catalog request for an ABR backup data set has failed. The Condition Code printed is the low-order byte of register 15 as returned by the catalog manager, in decimal. These codes are documented in various IBM manuals including SYSTEM PROGRAMMING LIBRARY: DATA MANAGEMENT for MVS and MVS/SP, and CATALOG ADMINISTRATION GUIDE for MVS/XA and MVS/ESA. Look under return codes for CAMLST CAT.  
 MAXIMUM VOLSERS EXCEEDED will be included if the ABR data set exceeded 20 volumes (for backup or archive).
- Action:**    If the condition code is eight (8), the backup name is already cataloged. Since the name of this backup duplicates a previous backup, this backup may not be usable. Some possible causes are:  
 – The REMODEL command ([Section 55](#)) has been used incorrectly.  
 – A full volume RESTORE or COPY under FDR or FDRABR has been done with VOLRESET=NO.  
 – A Stand Alone Restore has been done.  
 These operations can back-level the generation and cycle number. The REMODEL command of program FDRABR or the ABR ISPF dialogs can be used to update the model DSCB on the volume to the proper generation and cycle.
- If the condition code is 20, the ABR catalog is full. Failure to catalog this backup causes ABR to lose its automatic ability to restore data sets from the backup. Once the problem is corrected, it may be necessary to manually catalog the backup, from the information in the FDR305 message. If appropriate, contact INNOVATION technical support for assistance.
- If MAXIMUM VOLSERS EXCEEDED is printed, you must rerun the backup and reduce the volumes required with ABR compression (COMPRESS=), or hardware COMPAKTion (IDRC) or by using tape drives (such as 3490E) which fit more data per volume.

**FDR309 DDNAME=ddddddd,VOL=SER=vvvvvv NOT ELIGIBLE FOR AUTO BACKUP  
I/O ERROR COMP=xxxx**

**Reason:** The disk volume named in the message has not been initialized for ABR processing; the ABR model DSCB was not found in the VTOC of the volume. If I/O ERROR is displayed, an error occurred attempting to read the ABR model DSCB and xxxx is the return code from the OBTAIN SVC.

**Action:** To perform ABR processing (other than simulation) for this volume, you must initialize it for ABR processing with program FDRABRM (Section 90) or the ABR ISPF dialogs (Section 92). If operand NOINIT is specified, ABR will allow a simulation of the ABR function (command SIM) to be done.

**FDR310 MAXIMUM NUMBER OF CYCLES/DATE EXCEEDED-FDR DUMP FORCED ON VOL=vvvvvv**

**Reason:** The DUMP command requested an incremental or manual backup, but a full-volume backup is being forced instead, because:

1. The number of cycles within the generation had reached the maximum (63).
2. The DUMP command specified TYPE=ABR or TYPE=AUTO, and the most recent full volume backup (TYPE=FDR) had expired. Specifying operand DATEP=NONE on the DUMP TYPE= command would cause this check to be bypassed.
3. The DUMP command specified TYPE=AUTO, and the number of auto cycles within the generation was equal to or greater than the maximum specified in the ABR model DSCB on the volume.
4. This was the first backup after a full volume restore with FDR, or with ABR using the TAPEDD option.
5. This was the first backup after the volume was initialized for ABR processing.

**FDR311 function DSN=dsname [ALLOCATED] [CATALOGED] [LOGICAL]  
[TO NEWN=newsname]  
[ON VOLSER=volser UNIT=device [STORCLAS=sc MGMTCLAS=mc DATACLAS=dc] ]  
[CLUSTER=cluster [NEWC=newcluster] ]**

**Reason:** The data set or VSAM component described by the message was Dumped, Restored, Copied, or Moved. If "dsname" is an ICF VSAM component name, "CLUSTER=cluster" will indicate the cluster name. This message will always be printed on data set operations, and will be printed on full-volume backups if PRINT=DSN is specified. Message FDR392 may be printed instead for data set dumps.

On restore or copy/move operations the message will also indicate:

ALLOCATED	– if the dataset was allocated by FDR; if absent, a preallocated dataset was overlaid.
CATALOGED	– if the dataset was cataloged by FDR; if absent, either cataloging was not requested or the catalog request failed.
LOGICAL	– a logical restore was done, used when restoring to a unlike disk type, or when reblocking.
NEWN=	– shows the new dataset or component name if a restore to new name is being done. If it is an ICF cluster, "NEWC=newcluster" will show the new cluster name.
VOLSER=	– shows the output disk volume serial.

On a system with SMS (System Managed Storage) active, if the dataset is being restored to a SMS-managed volume, the SMS storage class ("sc"), management class ("mc") and data class ("dc") are displayed (management class and data class may be "(NULL)" if not assigned).

**FDR311 SELECTED DSN=dsname**

**Reason:** The data set or VSAM component described by the message was SELECTED during an ABR SIMREST restore.

**FDR312 WARNING-FDR WAS SPECIFIED WITH DSNAME CONTROL STATEMENTS-STATEMENTS IGNORED**

**Reason:** SELECT-type Commands were found following a DUMP TYPE=FDR Command. SELECT-type Commands will be ignored. However, If EXCLUDE ALLDSN control statements are found, the volumes specified will be EXCLUDED from the full-volume dump if they are not referenced by DISKxxxx DD statements.

**Action:** None, since all data sets on the volumes selected were backed up.

**FDR313 ABR | FDR | CPK TERMINATED BY OPEN EXIT ON VOL=SER=vvvvvv**

**Reason:** The optional FDR/ABR volume open exit has terminated processing of the volume specified (See Section 91.10).

**FDR314**    *ABR ARCHIVED AND | ABR WITH NO BACKUP | FDR SCRATCHED | NO SCRATCH*  
*DSNAME=dsname | CLUSNM=cluster*  
**SELECT VSAM COMP=compname**  
**[FROM VOL=vvvvvv][AND UNCATALOGED [RECAT FAILED]**  
**RECAT FOR RECALL [FAILED] ]**

**Reason:**    On DUMP TYPE=ARC, ABR scratched and archived the data set specified in the message. On DUMP TYPE=SCR, ABR scratched the data set without taking a backup. On MOVE TYPE=DSF, FDRCOPY scratched the input data set after creating the output data set.  
 If NO SCRATCH is printed, the user specified SCRATCH=NO and the dataset was not scratched or uncataloged.  
 If AND UNCATALOGED is printed, the catalog entry was also removed. (On a MOVE operation, AND UNCATALOGED will not be printed if the data set has been recataloged to the output volume, as shown in Message FDR311).  
 If RECAT FOR RECALL is printed, the RECALL operand was specified and the entry has been recataloged for the AUTO RECALL Exits.  
 If RECAT FOR RECALL FAILED is printed, the RECALL operand was specified but the attempt to recatalog the non-VSAM dataset for auto-recall failed. The dataset was archived and remains cataloged but will not be selected for auto-recall by the ABR LOCATE exit.  
 If AND UNCATALOGED RECALL FAILED is printed, the RECALL operand was specified but the attempt to recatalog the VSAM cluster as non-VSAM for auto-recall failed. The dataset was archived but is not cataloged at all and will not be selected for auto-recall by the ABR LOCATE exit.  
 If FDRABR DELETES a VSAM cluster, FDRABR will print each component name as it is selected from the VTOC. After the last component is passed in the VTOC the cluster is scratched. The message is then printed specifying the cluster name.  
 If FDRCOPY DELETES a VSAM cluster, FDRCOPY will issue the FDR314 message only for the cluster name, and will detail the component names in FDR311 messages.

**FDR315**    **DDNAME=ddddddd, VOL=SER=vvvvvv NOT ELIGIBLE FOR**                    *ARCHIVE | SCRATCH*  
**[MAXIMUM RUNS EXCEEDED]**

**Reason:**    The ABR model DSCB on this volume does not indicate that the volume is enabled for archive (DUMP TYPE=ARC) or superscratch (DUMP TYPE=SCR).

**Action:**    If you wish to perform archive or superscratch functions on this volume, you must update the options in the model with the MAINT command of program FDRABRM ([Section 55.01](#)) or the ABR ISPF dialogs ([Section 92](#)).

If the operand NOINIT is specified, ABR will allow a simulation (SIM TYPE=) of the volume to continue.

If MAXIMUM RUNS EXCEEDED is printed, more than 36 ARCHIVES of this volume were done today. This volume will be bypassed.

**FDR316**    *FDR | RECALL DID NOT FIND | EXCLUDED REQUESTED DSN/DSG=dsname*

**Reason:**    A data set or group was referenced on a SELECT statement, or was referenced by auto-recall or the remote queue, but the named data set or group was not found on any disk (for dump) or any backup data set (for restore) processed during the run. For ABR restore it may also mean that backup information could not be located for the data set (RESTORE TYPE=ABR) or it was not found on the Archive Control File (RESTORE TYPE=ARC). This can also be caused by a EXCLUDE preceding the SELECT for the same data sets. Another error (such as Message FDR325) may also cause the data sets not to be selected. If EXCLUDED is printed, the message simply documents that the named data sets were excluded.

**Action:**    If this is an error, correct and resubmit job. If a full-volume dump was forced, as shown by Message FDR310, the SELECT Commands were not processed, and Message FDR316 appears for every SELECT Command. However, all data sets on the volume were dumped. The user can review the FDR311 messages to determine whether the data sets that were specified actually were on the volume. If SELTERR=NO is specified, FDR will not issue an ABEND or condition code.

**FDR317**    **I/O ERROR ON DISK TRACK X'ccccchhh'**

**Reason:**    ABR encountered an I/O error while reading or writing the VTOC. The FDR MINI DUMP will be printed.

**Action:**    ABR will continue processing the VTOC bypassing this track. Contact INNOVATION for assistance.

**FDR318**    **DUMP COMPLETED WITH NO DATA SETS SELECTED**

**Reason:**    A data set backup was made with no data sets being selected by either control statements or automatic functions.

**Action:**    If this is an error, correct and resubmit.

**FDR319 FDR OPERATION ABNORMALLY TERMINATED VOL=vvvvvv COMP CODE=Ssss Uuuuu**

- Reason:** FDR Internal Dump/Restore operation failed on the volume indicated.  
COMP CODE is the completion code from the subtask.
- a) Ssss=System ABEND code. Refer to the IBM System Codes manual. Some system abends may be from other software, such as security or tape management, especially if the last 2 hex digits are 80 or greater.
  - b) Uuuuu=User ABEND or Comp Code. This field is printed in decimal. Refer to [Section 80.05](#). FDR will usually print an error message detailing the error.
- Action:** If the problem cannot be determined by the completion code, call INNOVATION for technical assistance. If the program produced a storage dump, have it available. If this is an ABR backup (incremental or archive) to tape, and there are more disk volumes to be processed, ABR will call for a fresh scratch tape on the output drive for the TAPEX and TAPEX DD statements in use by the dump subtask that abended.



**FDR320 UNABLE TO RESTORE REASON=x-DSNAME=dsname**

**Reason:** FDR was unable to restore the data set specified in the message. The accompanying reason code will further define the problem.

REASON CODE	EXPLANATION
1	– The internal subtask operation restoring this data set from a backup tape failed. The ABEND code appears on the FDR319 message. Check SYSPRINn report for error messages, if any.
3	– I/O error reading a Format 2 or Format 3 DSCB from the output disk.
6	– Data set enqueue failed for this data set. DSNENQ=NONE will override this check.
B	– Data set is unmovable.
C	– Data set not found on the backup file. The user may have misspecified the backup to restore from, or it may be due to: <ol style="list-style-type: none"> <li>1. The same dsname was specified on more than one control statement or the dsname is a component of previously requested ICF VSAM cluster.</li> <li>2. On an ABR restore, without GEN, CYCLE or TAPEDD specified, the data set was renamed since the last time it was backed up.</li> <li>3. For ICF VSAM clusters, can occur if there was more than one VVR for a component of the cluster in the VVDS of the original disk when dumped (this is an error).</li> </ol>
D	– Data set has an F3 DSCB, but it could not be found on the tape.
E	– Data set was being restored to a new name, and FDR was unable to confirm that the user has READ authority to the original data set: <ol style="list-style-type: none"> <li>1. If the FDR RACF option is enabled, and the input data set is flagged as being protected by a discrete RACF profile, either the user does not have READ authority to it, or no RACF profile currently exists for the data set.</li> <li>2. If the FDR ALLCALL option is enabled, for any input data set, either the user does not have READ authority to it, or no RACF profile (even a generic profile) currently exists for the data set.</li> <li>3. If the FDR VSAMPASS option is enabled, ICF VSAM clusters cannot be restored to a new name.</li> </ol>
G	– Unable to locate data set's F3 DSCB on target volume or F2 DSCB found for a non-ISAM data set.
J	– Data set was RACF or password protected when it was backed up, but user has pre-allocated it without protection, or vice versa.
K	– Data set has not reached its expiration date, and the operator replied "NO" to the FDRW03 message.
O	– PRESTAGE was specified. Data set restore bypassed since data set was found.
P	– Data set type conflict when restoring to a pre-allocated data set. SUL (Standard User Label) data set is being restored to a non-SUL data set or vice versa. ISAM is being restored to non-ISAM or vice versa. VSAM is being restored to non-VSAM or vice versa. ICF VSAM is being restored to non-ICF VSAM or vice versa.
T	– FDRCOPY COPY/MOVE detected a copy/move of a data set on top of itself (same volser, same data set name).
U	– Error updating ISAM Format 2 DSCB, or ICF VSAM component in the VTOC but not in the VVDS.
V	– ICF VSAM cluster is being restored to a VSAM cluster which has different options or characteristics. Message FDR152 or FDR159 details the error.
W	– Catalog inaccessible. Possible causes are: <ol style="list-style-type: none"> <li>1. On a restore of an ICF catalog, the JCL contained a STEPCAT or JOBCAT DD statement. This is not supported.</li> <li>2. On a restore of an ICF catalog, the catalog being restored was defined in the master catalog, but it was not usable (probably did not actually exist on disk). You must remove the entry for the old catalog, probably by IDCAMS EXPORT DISCONNECT.</li> </ol>
X	– Data set security exit rejected this data set.
Y	– NEWINDEX= failure or duplicate data set name generated.
Z	– One or more data sets failed to restore using ALLDSN or DSG. Check the subtask listing for errors.

**Action:** Take appropriate action and/or contact INNOVATION for assistance.

**FDR321 UNABLE TO RESTORE REASON=x-DSNAME=dsname**

**Reason:** The data set specified in the message was unable to be restored. The accompanying reason code will further define the problem.

REASON CODE	EXPLANATION
2 -	The user did not specify any DISKxxxx DD statement that was a compatible device type for the data set being restored. Occurs with NEWVOL=NONSPEC, or TAPEDD= without VOL= or NVOL=.
3 -	The OPERATOR operand was specified, but the operator replied 'NO' or 'BYPASS' to the request for the backup tapes needed to restore the data set.
5 -	The disk volume which DSF or ABR was attempting to restore the data set could not be opened, or could not be dynamically allocated.
A -	The data set was found on disk but ABR had no current backup information for it. Either the data set has never been backed up by ABR or it has been deleted and reallocated since its last backup. This can also occur if some other software has corrupted ABR's backup information in bytes 103 and 104 of the DSCB. If you can identify an ABR backup which contains the data set, you can specify GEN= and CYCLE=(and perhaps VOL=) or TAPEDD= to restore it.
B -	The indicated data set is not cataloged, or is not on the volume identified by the system catalog (or by the VOL= operand if specified). It was also not found in ABR's record of scratched and renamed data sets. The most likely causes are: 1. The DSN= or VOL= operand is incorrect. 2. The data set was archived. 3. ABR is not recording scratched and renamed data sets. In any case, if you can identify a backup tape containing this data set, you can restore it by specifying VOL=, GEN=, and CYCLE= or TAPEDD=.
D -	The ABR catalog did not contain the backup file DSNAME to which this data set was dumped. If COPY=n was specified, the reason may be that the specified copy was not created. If the backup file still exists but has been uncataloged, TAPEDD= can be used to restore the data set.
E -	This data set was on an expired ARCHIVE tape. If this tape has not been reused, you can restore the data set by specifying TAPE=EXP on the RESTORE control statement.
F -	The volume from which the data set was backed up, as specified by the VOL= operand or the catalog, is not currently initialized for ABR processing; or an I/O error occurred when reading the ABR model DSCB controlling the disk volume. You can restore the data set by specifying the CYCLE and GEN operands or the TAPEDD operand.
G -	SELECT Command for a data set restore did not specify VOL=. This data set was not found in the system catalog, or in ABR's record of scratched data sets. See reason B for suggestions.
H -	The volume from which the data set was backed up, as specified by the VOL= operand or the system catalog, was not mounted. The volume must be mounted or the user must specify CYCLE= and GEN= or the TAPEDD= operand.
J -	GEN= was specified without CYCLE=.
K -	TAPEDD=x was specified but no TAPEx DD was found, or TAPEDD was specified with TYPE=ARC.
L -	The data set was not found on the volume specified by the VOL= operand (if coded) or by the catalog or it was found but had no current ABR backup. The data set was found in ABR's record of scratched and renamed data sets, but with a different volume serial. You can restore the data set by specifying VOL= the volume in the ABR SCRATCH catalog, or by specifying VOL= and CYCLE= (and possibly GEN=) for any volume and cycle on which the data set was backed up, or by specifying TAPEDD=.
M -	COPY=2 was requested for this data set, but the ARCHIVE control data set indicates that a second copy was not created during archival.
N -	The backup file containing this data set failed to OPEN, or dynamic allocation error. Check the JES job log for IBM error messages. The backup data set may have been written over.
Q -	RACF authorization error.
R -	The backup file containing this data set was not an FDR/DSF formatted data set; or an I/O error occurred reading the FDR Header Record.
T -	A TYPE=ABR restore had a SELECT statement that specified DSG= or ALLDSN without either TAPEDD= or VOL=, GEN= and CYCLE=.
X -	A DSF absolute track restore was requested (SELECT FROM/TO) and cylinder or track numbers were specified which are invalid for the type of disk which was backed up.
Y -	OLDBACKUP was specified. The data set does not contain as many levels of OLDBACKUP information as requested by the OLDB=nn operand, or the specified backup is no longer in the ABR catalog.
Z -	A user requested a data set restore with a TAPEx DD statement. The backup of this data set exists on more than 5 tape volumes. To restore this data set specify the DYNTAPE option or the TAPEDD option.

**Action:** Take appropriate action for the problem described by the message.

**FDR322 FDRABR FAILED TO STAGE MSS COMP=nnnn**

**Reason:** An MSS volume was requested which ABR attempted to stage but the staging request has failed. ABR will continue without staging.

**Action:** The failure can be determined by using the completion code returned. COMP= shows the reason code returned by the staging SVC. Reason codes are documented in the IBM MSS MESSAGES Manual. A code of X'0F00' or above was issued internally by ABR. If appropriate, call INNOVATION technical support for assistance.

**FDR323 DDNAME=ddddddd DOES NOT SPECIFY A DISK**

**Reason:** DD statements whose ddnames start with DISK must point to a disk device.

**Action:** Correct and resubmit job.

**FDR324 DDNAME=ddddddd IS MISSING OR IN ERROR REASON=x**

**Reason:** A failure has occurred for DDNAME specified in the message. The accompanying reason code further defines the problem. For reason codes other than those listed below, see the manual.

REASON CODE	EXPLANATION
1 -	SYSIN DD statement missing.
2 -	I/O error on SYSIN data set or remote queue data sets.
3 -	ARCHIVE DD statement missing and DYNARC was not specified.
4 -	ARCHIVE control file block size is zero. The file may have been allocated but never initialized. If so, use FDRARCH to initialize it.
5 -	I/O error on ARCHIVE control file.
6 -	The date of the last ARCHIVE function, as recorded on the ARCHIVE Control file, is higher than the current date set within the Operating System. To override the ABR date check, specify PROT=NONE on the DUMP TYPE=ARC statement. The PROT=NONE operand should only be used on the next ARCHIVE run. The ARCHIVE Control file will be out of date sequence.
7 -	A block of the ARCHIVE control file did not contain the ABR identification. The ARCHIVE control file was written to incorrectly, or was written to by other than a module of the ABR system. It must be restored from the most recent backup. Please call INNOVATION if this problem occurs.
8 -	The ARCHIVE control file is full. You can reorganize or expand it with FDRARCH.
9 -	The number of TAPEX DD statements exceeded ten.
A -	No TAPEX DD statements were found (may have been DD DUMMY), or OPEN failed on the backup file (check the job log for an Sx13 ABEND message).
B -	The number of DISKxxxx DD statements plus any volumes selected by ONLINE, ONLVOL, and MOUNT was greater than the value specified in the MAXDD operand (default of 256).
C -	ABRWORK DD statement was missing on a restore.
D -	A SYSPRINx DD statement was missing. ABR requires a SYSPRINx DD statement for each TAPEX DD statement.
E -	A DISKx ddname was used more than once in the JCL for this step.
F -	A FDR or FDRDSF backup specified DISP=MOD on the TAPEX DD card. The disk volume associated with this tape will not be processed.
K -	LASTAPE was specified but the TAPEX DD specified more than one tape volume serial.
L -	DYNTAPE was specified to dynamically allocate the backup medium. ABR found that a TAPE# DD statement already exists. This is the RESERVED name for DYNTAPE.
M -	COPY or MOVE was specified. The TAPEX DD statement for the target volume was not a DISK or specified DUMMY.
N -	The TAPEX DD statement specified the same volume serial as the DISKx DD statement.
Q -	An ABR dump specified DISK as the backup medium (TAPEX). ABR found that the volume to be dumped (DISKx) was the same as the backup medium (TAPEX). This volume will be bypassed.
R -	Space allocation was not successful on any of the DISK volumes specified by the TAPEX DD statement. The output volumes may be full, or the data set name being allocated already exists on the output volume (possibly due to an aborted ABR run). If possible, scratch the duplicate name or use SUPERSCRATCH with SELECT ABRBKUP to delete expired ABR backup files.
T -	User specified multiple TAPEX DD statements using the same last character (x). The first one specified DUMMY.
U -	Dynamic allocation or OPEN of the output disk volume failed. Check for IBM or FDR error messages.
<b>Action:</b>	Take appropriate action for the problem described by the message.

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**FDR325 FDRABR NO DISK DD STATEMENTS FOUND**

**Reason:** No DD statements were found having ddnames starting with DISK. Neither ONLINE, ONLVOL nor MOUNT was specified; or ONLVOL was specified but no volumes were specified by VOL=, VOLG=, or CATDSN= operands. This can also occur with ONLVOL if there were no SELECT commands, perhaps because the remote queue was empty.

**Action:** Supply at least one MOUNT command or DISK DD statement, or specify ONLINE.

**FDR326 RESTORE | COPY | MOVE ENDED WITH NO DATA SET | VOLUMES RESTORED | SELECTED**

**Reason:** DSF, FDRCOPY, or ABR was not able to successfully process any of the data sets or volumes specified; or, no SELECT Commands followed a RESTORE Command.

**Action:** Correct and resubmit.

**FDR327 CATALOG FAILURE TO LOCATE TAPE DSNAME=nn...nn**

**Reason:** A restore from the backup sub-system was requested. The backup tape was not found in the catalog. If restoring using OLDB=nn, it may be that the backup generation and cycle selected has been uncataloged by ABR, or by your tape management system.

**Action:** If the required backup tape is still available (has not been overwritten), even though it is not cataloged, restores can still be done from it using the TAPEDD=n operand, and providing a TAPEn DD statement specifying the ABR backup data set name, volume serials, and file number (LABEL=n). This information can be found on the reports that the ABR system generates.

**FDR328 UNABLE TO RESTORE REASON=reason-VOL=vvvvvv NVOL=vvvvvv**

**Reason:** ABR was unable to perform a full volume restore (RESTORE TYPE=FDR). "reason" is a reason code plus explanatory text as shown below. VOL= is the serial of the volume whose backup is being restored. NVOL= is the serial of the target volume. Check the reason code for the error.

REASON CODE	EXPLANATION
1 -	ABR did not find a DISKxxxx DD statement pointing to the disk volume to be restored to.
2 -	GEN= was not specified and ABR could not read the model DSCB associated with the pack to be restored. This can occur if the VOL= volume was not mounted, or has been reinitialized. Specify GEN and CYCLE or GEN=CURRENT.
3 -	TAPEDD=x was specified. ABR could not find a TAPEX DD statement with the same character as specified in this operand.
4 -	GEN=nnnn was specified without CYCLE=nn.
5 -	GEN=CURRENT was specified but either no backup entries for this volume found on the ABR catalog or an I/O error reading the catalog.
6 -	A backup of an SMS volume is being restored to a non-SMS volume, or a backup of a non-SMS volume is being restored to an SMS volume. If "OVERRIDDEN" is displayed, then an SMS backup is being restored to a non-SMS volume using SMSPROT=NONE.

**FDR329 DD=ddname1 IS A DUPLICATE VOLUME OF DD=ddname2**

**Reason:** The disk volume referenced by DD statement "ddname1" is the same as that referenced by "ddname2" ABR will process the volume only once.

**FDR330 LAST TAPE OR POOL OPTION FAILED ON TAPE DD=ddname REASON=x**

**Reason:** ABR was unable to satisfy the user's request for LASTAPE, POOLTAPE or POOLDISK option.

REASON CODE	EXPLANATION
1 -	The LASTAPE file failed to open. The LASTAPE file may have been overwritten. Check the open error abend message on the log. Resubmit the job and ABR will ask for a scratch tape.
2 -	POOLTAPE catalog error. ABR could not locate the next (+1) generation. This name may not be cataloged as a GDG.
3 -	POOLTAPE is not a cataloged data set.
4 -	POOLTAPE specified more than 20 tape volume serial numbers. Maximum is 20 tape volumes.
5 -	POOLTAPE failed to re-catalog.
6 -	POOLDISK option was specified, but the volumes indicated were not DISK.
9 -	The LASTAPE or POOLTAPE option did not specify a tape unit.
A -	LASTAPE uncatalog failed. The SVC 26 uncatalog return code is displayed in COMP=xxxx.
<b>Action:</b>	If cause cannot be determined, contact INNOVATION for assistance.

**FDR331 ARCHIVE BACKUP TERMINATED WITH HARDWARE ERRORS [BAD FORMAT 4]**

- Reason:** ABR encountered disk or tape I/O errors during the physical dump of the data sets to be archived. Another message is printed in the SYSPRINx report to document the exact error. Since ABR would normally scratch these data sets after dumping them, a clean backup is imperative. Therefore, the archive run for this volume has been aborted. If BAD FORMAT 4 is printed, the cause was an invalid or duplicate Format 4 DSCB detected in the VTOC when preparing to scratch the data sets.
- Action:** Correct error and rerun job. If the error cannot be easily corrected, EXCLUDE the data set causing the error.

**FDR332 function SCRATCH FAILED | BYPASSED ON DSN=dsname**

- Reason:** A non-VSAM data set could not be deleted during a FDRCOPY move (MOVE TYPE=DSF), ABR ARCHIVE (DUMP TYPE=ARC), or ABR SUPERSCRATCH (DUMP TYPE=SCR).

FAILED indicates that a SCRATCH SVC (for non-SMS data sets) or DELETE NVR (for SMS-managed data sets) failed to scratch this data set. A minidump is printed showing the registers and SCRATCH or DELETE parameter list.

For a SCRATCH of a non-SMS data set, the SCRATCH status code appears in the minidump, in the first line after the registers, in the second byte of the last word. Code 7 indicates that SCRATCH failed because the data set was in use; this can be avoided by using the DSNENQ= option. Code 2 or 8 indicates a security violation.

For a DELETE NVR of a SMS data set, Register 15 contains the return code, and the reason code is in the last 2 bytes of the 6th word of the first line after the registers. These codes can be found under Message IDC3009I in the appropriate IBM Messages manual.

On DUMP TYPE=ARC, ABR has recorded the data set as archived, in the ARCHIVE control file. On DUMP TYPE=ARC or DUMP TYPE=SCR, this data set may have been uncataloged. Message FDR314 is also printed for this data set. On MOVE TYPE=DSF, if the data set was cataloged, it has been successfully recataloged and/or uncataloged.

If BYPASSED is printed, the scratch was not attempted for this data set, because of an earlier error, such as a catalog error, which is described by another message.

- Action:** If appropriate, scratch the data set manually. If desired, contact INNOVATION for assistance.

**FDR333 CARD IMAGE-control statement image**

- Reason:** Displays a control statement read from an ABR remote queue data set (DDname ABRREST for RESTORE TYPE=ABR, ABRARCH for RESTORE TYPE=ARC, ABRBKDQ for DUMP TYPE=ABR/AUTO, ABRARDQ for DUMP TYPE=ARC).

**FDR334 FDR FAILED TO CATALOG      COMP=X'ffff00001111' DSN=dsname |**  
**DSN=dsname ALREADY CATALOG VOL=vvvvvv |**  
**DSN=dsname NAME IS AN ALIAS**

- Reason:** FDR allocated and restored the non-VSAM data set specified in the message, but could not catalog it. If COMP is printed, it shows the return code returned by the catalog manager, in hex. ffff is register 15, 0000 is register 0 and 1111 is register 1. The return codes are documented in the IBM manuals SYSTEM PROGRAMMING LIBRARY: DATA MANAGEMENT for MVS, or CATALOG ADMINISTRATION GUIDE for MVS/XA or MVS/ESA (the function is CAMLST CATBX or CAMLST RECAT). If the register 15 value is X'2330', then the code was generated by FDR, and indicates either that the data set was cataloged on more than 20 volumes, or that the volume sequence number was higher than 20. In this case the register 0 value is the number of volumes in the catalog entry. FDR supports cataloging of multi-volume data sets up to a maximum of 20 volumes.

If ALREADY CATALOG is printed, then RECAT was not specified, and the output data set was already cataloged to a volume (vvvvvv) other than the output volume (or the input volume for a MOVE). For a multi-volume data set, vvvvvv is the volume in the catalog entry that corresponds to the volume sequence number of the portion of the data set that has just been processed.

- Action:** Determine the cause and take appropriate action. If desired, contact INNOVATION for assistance.

**FDR335 ABR BYPASSED RESTORE ON EXISTING DSN=dsname****FDR335 ANOTHER TASK COMPLETED RECALL OF DSN=dsname**

**Reason:** The first form of the message occurs when the PRESTAGE option was specified but the dataset was found on the first output disk selected. The second form occurs when an auto-recall of a dataset is required before a previous auto-recall for the same dataset has completed.

**FDR336 DYNAMIC ALLOCATION ERROR COMP=cc, CODE=nnnn, INFO=iiii, DDNAME=ddname [VOL=vvvvvv BYPASSED]**

**Reason:** Dynamic allocation was requested for a disk volume or a data set (such as a disk or tape backup data set or the Archive Control File), but the allocation failed. COMP is the return code in REG 15, CODE and INFO are from the dynamic allocation parameter list. These are documented in the IBM manual SPL: JOB MANAGEMENT for MVS or SPL: SYSTEM MACROS AND FACILITIES for MVS/XA, and SPL: APPLICATION DEVELOPMENT GUIDE for MVS/ESA.

Frequently encountered CODE values include:

210— requested data set not available (e.g., another job had the Archive Control File with DISP=OLD).

220— requested volume not available (e.g., another job is using a tape volume required by ABR).

484— the operator replied "NO" to Message IEF235D.

1708— data set not found in the catalog (e.g., the name in the ABR option table for the Archive Control File does not exist in the catalog).

VOL=vvvvvv BYPASSED indicates that ABR bypassed processing the indicated volume because of the error.

**Action:** This volume or data set operation will be bypassed. In some cases, the error can be avoided by setting the dynamic allocation flags in the ABR global option table ([See Section 91 or 92](#)). If necessary, contact INNOVATION for assistance.

**FDR337 ABR PRESTAGE-ALL DATA SETS ALREADY EXIST**

**Reason:** PRESTAGE was specified and all of the data sets to be restored were found to exist.

**Action:** ABR will terminate the operation with no data sets restored.

**FDR338 MAXIMUM BACKUP FILES EXCEEDED - SPECIFY MAXBACKUP=N TO OVERRIDE**

**Reason:** An ABR restore job was requested to restore data sets from more than the maximum separate backup data sets (default is 100 backup files). The restore job will fail with a U0628 ABEND.

**Action:** Specify MAXBACKUP=n on the RESTORE statement or eliminate some of the requested data sets to reduce the number of backup files required.

**FDR339 BACKUP OF ARCHIVE FILE WAS BYPASSED**

**Reason:** This is a warning that ABR either was unable to backup the ARCHIVE control file, or was instructed not to, by the ARCBACKUP=NO operand.

**FDR340 RACF DEFINE/CHECK ERROR ON DSN=dsname COMP CODE=ccc**

**Reason:** FDR issued a RACF DEFINE or CHECK for the data set indicated, but it failed with return code ccc.

**Action:** Determine the cause.

**FDR341 VTOC CONVERT ROUTINE ERROR COMP=ccc**

**Reason:** A FDR function attempted to allocate a dummy data set with the DOS flag set in the VTOC in order to invoke the DOS VTOC conversion routine to recalculate the free space on a volume. This allocation failed with decimal return code ccc; these are documented under "allocation" or "REALLOC" in the IBM Manuals SPL: DATA MANAGEMENT for MVS, SYSTEM DATA ADMINISTRATION for MVS/XA, and DFP DIAGNOSIS REFERENCE for MVS/ESA. A code of 172 indicates that your security system rejected the dummy data set (which begins with "FDRABR.Vvolser"). A code of 176 or 180 indicates that a user-provided DADSM exit rejected the request.

**Action:** If ARCHIVE, the archive of data sets from this volume is complete, but the volume free space may not be accurate. If you specify SCRATCH on the DUMP TYPE= command, the error will not occur. Check the disk volume with COMPAKTOR or contact INNOVATION.



**FDR343 SMS CONSTRUCT ERROR VOL=vvvvvv STORGRP=sssssss REASON=reason**

**Reason:** FDRABR queried SMS for a storage group definition because 1) a SMS-managed volume was selected for processing, or 2) MOUNT STORGRP= was specified, and an error occurred. "vvvvvv" is the volume involved (if known), and "sssssss" is the SMS storage group (if known). "reason" is the error text:

**SMS ERROR COMP=xxxx CODE=ccccc** – the IBM SMS interface failed the query with return code "xxxx", which is defined in the IBM manual DFP DIAGNOSIS REFERENCE under "SMS SUBSYSTEM RETURN CODES", and "ccccc" is the SMS reason code, documented in the same manual under "SMS REASON CODES".

**STORAGE GROUP TYPE IS NON-POOL** – a VIO or DUMMY storage group name was specified.

**STORGRP NOT ENABLED FOR MIGRATION** – for DUMP TYPE=ARC or TYPE=ARC, the storage group was not enabled for auto migration.

**STORGRP NOT ENABLED FOR AUTO BACKUP** – for DUMP TYPE=ABR TYPE=DSF or TYPE=AUTO, the storage group was not enabled for auto backup.

**STORGRP NOT ENABLED FOR AUTO DUMP** – for DUMP TYPE=FDR, the storage group was not enabled for auto dump.

**STORGRP CONSTRUCT NOT FOUND** – the specified storage group name was not found by SMS.

**STORGRP NOT FOUND OR NO VOLUMES** – The storage group is inactive or contains no active volumes. Determine which storage groups and volumes are available using ISMF or the operator command "D SMS,STORGRP(ALL),LISTVOL".

**STORGRP MORE THAN 255 ACTIVE VOLS** – storage groups with over 255 volumes are not supported by MOUNT STORGRP=.

**STORGRP CONTAINS NO ONLINE VOLUMES** – the specified storage group contains no volumes online to the operating system.

**Action:** ABR will bypass the volumes or storage group specified and continue. If necessary, correct the error and resubmit.

**FDR344 FDR FAILED TO FIND THE ABR HIGH LEVEL INDEX**

**Reason:** FDRABR issued a LOCATE (SVC 26) for the ABR high levelindex, however, the alias could not be found.

**Action:** Use IDCAMS LISTCAT to list the master catalog and determine if an alias entry exists for ABR. Check the ABR high level index name specified in the FDR global options table and determine if the name matches the one in the master catalog. If cause cannot be determined, contact INNOVATION for assistance.

**FDR345 FILTER ERROR REASON=reason - ENTRY=entry**

- Reason:** SELECT CATDSN=filter was used to select entries from the system catalogs, and an error occurred. "entry" indicates the catalog name or the catalog entry on which the error occurred. "reason" indicates the error:
- 1 - NO CATALOGED ENTRIES FOUND** - the filter did not select any entries from the catalogs.
  - 2 - CATLG ERROR COMP=cccc CODE=reason** - The IBM catalog SVC returned error code "xxxx" with reason code "reason". These codes can be found in the IBM SYSTEM MESSAGES manual under message IDC3009I.
  - 3 - CATLG NAME FPL ADDR MISSING** - internal error.
  - 4 - CATLG VOLSER FPL ADDR MISSING** - internal error.
  - 5 - CATLG VOLSER 0 OR MORE THAN 20** - a catalog entry was selected that had either 0 volsers or more than 20 volsers.
  - 6 - MAXCARDS MUST BE INCREASED** - since a SELECT statement is simulated for every data set selected from the catalog, the value of MAXCARDS= must be large enough to accomodate all selected data sets.
  - 7 - CATLG ENTYPE FPL ADDR MISSING** - internal error.
  - 8 - CATALOG IS CVOL ALIAS=alias** - OS CVOL catalogs cannot be searched if a filter (not a fully-qualified data set name) was specified.
  - 9 - NOT SUPPORTED ON NON-MVS SYSTEMS** - catalog searching is supported only on MVS, XA, and ESA systems.
  - A - NAME LAST CHARACTER HIGH VALUES** - internal error.
  - B - VSAM COMPONENTS NOT FOUND** - a ICF VSAM cluster was selected from the catalog but catalog entries for its components were not found.
  - C - VOL= CANNOT BE SPECIFIED** - The VOL= operand can not be specified on a SELECT CATDSN= statement in a RESTORE operation.
  - D - CANNOT END IN A PERIOD** - The filter cannot end in a period. [See Section 52.16](#) for filter rules.
  - E - INVALID GENERATION NUMBER** - The filter ends in an invalid GDG relative generation number.
  - F - SEQUENCE ERROR IN CATALOG** - A VSAM sequence error was encountered reading an ICF catalog, indicating a structural error in the catalog.
  - G - ALL ENTRIES EXCLUDED OR DUPS** - all catalog entries selected by this filter were either excluded by a preceding EXCLUDE statement, or were previously selected by a preceding SELECT CATDSN= statement.
- Action:** Serious errors will cause a U0502 ABEND. Others (such as reason 1) will simply be treated as if a SELECT statement did not select any data sets, unless SELTERR=NO was specified.

**FDR346 FILTER SELECTED VOL=volser DSN=dsname**

**FDR346 FILTER SELECTED ALIAS=alias CAT=catalog TIME=hhmmss**

**FDR346 FILTER SELECTED nnnnnnnn ENTRIES in sssss.ss SECONDS**

**Reason:** A filter was used to select entries from the system catalogs. The first form of the message will be displayed only if PCATDSN= was used (instead of CATDSN=) and indicates each data set name selected from the catalog and the volser it is cataloged on.  
The second form of the message will be displayed only if the PRTALIAS operand was specified, and indicates each alias which was selected from the master catalog by the filter and the name of the user catalog which was searched for it (even if no data sets were selected in that alias).  
The third form of the message documents the number of entries selected by the filter, and the elapsed time in seconds required to complete the search.

**FDR347 SMS MGMTCLAS ERROR VOL=volser REASON=reason DSN=dsname**

**Reason:** SMSMANAGE=YES was specified, but an error occurred trying to use SMS management classes for ABR processing. "volser" identifies the volume being processed (if known) and "dsname" identifies the data set being processed for errors related to a particular data set. "reason" describes the error:  
**GETMAIN FAILURE – MGMTCLAS DISABLED** indicates that the GETMAIN for storage above the 16M line to hold the definitions of all active management classes failed. Management class processing will be disabled.  
**NVR/VVR TYPE UNKNOWN** – a VVDS record was not type N, Z, or Q. The VVDS may be damaged.  
**TYPE 23 NOT FOUND** – The type 23 cell was not found in a ICF VSAM VVR. The VVDS may be damaged.  
**TYPE 21 NOT FOUND** – The type 21 cell was not found in a ICF VSAM VVR. The VVDS may be damaged.  
**TYPE 22 NOT FOUND** – The type 22 subcell was not found in a ICF VSAM VVR. The VVDS may be damaged.  
**TYPE 24 NOT FOUND** – The type 24 cell was not found in a non-VSAM NVR. The VVDS may be damaged.  
**MGMTCLAS INVALID** – The management class name in the NVR/VVR of a SMS-managed data set (or the default management class name) is not currently defined to SMS.  
**NO MGMTCLAS TABLE** – internal error.  
**NO VVDS ENTRY** – No NVR/VVR was found in the VVDS for a SMS-managed data set. The VVDS or the VTOC may be damaged, or creation of a SMS-managed data set was interrupted.  
**MULTI-VOL ERROR** – for a multi-volume data set, a LOCATE is done on other than the first volume to get the management class, and it failed.  
**Action:** If DSN= is displayed, that data set will not be selected by ABR in this run. If possible, correct the error and rerun. If necessary, contact INNOVATION for assistance.

**FDR348 VOL=volser ALLOCATED SPACE IS aaa% – THRESHOLD is ttt% –  
SELECTED DUE TO THRESHOLD  
BYPASSED SPACE UNDER THRESHOLD**

**FDR348 VOL=volser ALLOCATED SPACE IS aaa% – AFTER ARCHIVE/SCRATCH**

**FDR348 VOL=volser BYPASSED**

**Reason:** In an ARCHIVE or SUPERSCRATCH run, volume threshold selection was requested via the THRESHOLD= operand and volume "volser" is being processed. In the first form of the message, "aaa" is the percentage of tracks currently allocated and "ttt" is the threshold percentage used by ABR on that volume. (See Section 51 for details on the source of the threshold value). If "aaa" is less than "ttt" the volume will be selected for processing, otherwise it will be bypassed in this run.  
The second form of the message will be printed after the ARCHIVE or SUPERSCRATCH completes, giving the new percentage of tracks allocated.  
The third form of the message indicates that a LSPACE (SVC 78) issued to obtain the current allocation percentage, returned a non-zero return code. The volume will not be selected.

- FDR355 A DUPLICATE NAME WAS SPECIFIED OR GENERATED – FDR BYPASSED DSN=dsname**  
**Reason:** NEWNAME=, NEWGROUP=, or NEWINDEX= was specified on one or more SELECT statements. However, when this was applied to the original data set name shown as "dsname", it resulted in an output data set name which duplicated the output name of another data set being restore or copied.  
**Action:** Change the newname specification to generate unique names.
- FDR360 CYL=cccc-cn cn cn...**  
**Reason:** Internal diagnostic message optionally printed by the ABR full-volume restore processor showing each cylinder and head restored and the cycle number (cn) of the tape (0 thru 63) that it is restored from.
- FDR361 TAPE WAS RESTORED DSN=dsname**  
**Reason:** ABR successfully restored this tape on a full volume restore (RESTORE TYPE=FDR).
- FDR363 OPERATOR CANCELLED RESTORE FOR TAPES**  
**Reason:** The OPERATOR keyword was coded on the ABR RESTORE TYPE=FDR statement for a full-volume restore, but the operator replied "NO" to the FDRW25 message.  
**Action:** The restore for this volume was cancelled.
- FDR364 TAPE WAS BYPASSED BY OPERATOR DSN=dsname**  
**Reason:** The OPERATOR keyword was coded on the ABR RESTORE TYPE=FDR statement for a full-volume restore, but the operator replied "BYPASS(nn)" to bypass the incremental backup "dsname".  
**Action:** This incremental backup file will not be restored. Other incremental backups in the generation will be restored, which may cause some data sets to not be restored to their latest backup.
- FDR365 TAPE WAS NOT FOUND DSN=dsname**  
**Reason:** ABR attempted to locate this backup file on the catalog. The catalog search failed. This entry may have been uncataloged.  
**Action:** ABR will bypass this file. Use the TAPEDD operand on the SELECT statement if the data set name, volume serials and file number are known. Contact INNOVATION for assistance.
- FDR366 CYL TRKS-0.....5....ABCDEF0.....5....ABCDEF – TRACKS NOT FOUND ON TAPE**  
**Reason:** The indicated tracks were expected to be on the backup tape, but they were not found. One detail line is printed for each cylinder for which tracks were not found. The cylinder number is printed in decimal. the track(s) that were not found are each indicated by an 'X'. The position of the 'X' indicates the number of the track: the first position after the hyphen in the heading line represents track 0, the next position is track 1, and so on.  
**Action:** Review the listing from the backup run that created the tape. A possible reason for getting Message FDR366 on a restore is that Message FDR123 with REASON=2 appeared on the backup run, indicating that the entire cylinder was not dumped. On a restore with DSF, if Message FDR155 does not appear, then the tracks not found were not needed, and the requested data sets have been correctly restored. On a restore with FDR, Message FDR366 always indicates that not all of the tracks have been restored. If appropriate, contact INNOVATION for assistance.
- FDR367 ABR TERMINATED RESTORE FOR NOT FINDING FDR TAPE**  
**Reason:** On a full-volume restore, ABR could not locate the full-volume restore tape (cycle 00) in the ABR catalog. Message FDR365 identifies the backup data set.  
**Action:** This volume restore is terminated. The manual restore option (TAPEDD=) must be used.
- FDR368 TAPE WAS BYPASSED FOR LACK OF A VTOC DSN=dsname**  
**Reason:** On a full-volume restore, "dsname" was the cycle with which ABR was attempting to begin the restore, but ABR bypassed this tape since it was a manual backup (TYPE=DSF) and did not contain the VTOC.  
**Action:** If the restore is from the ABR system, the next lowest cycle number in the current generation will be used to begin the restore. Any data sets on the bypassed backup will not be restored to their most current status.
- FDR370 OPEN ERROR – TAPE BYPASSED DSN=dsname**  
**Reason:** A full-volume restore operation was requested from this tape. The open of the tape failed. An IBM message and ABEND code is printed on the job log. ABR will bypass this tape unless it is the full volume (FDR) backup.  
**Action:** Check messages on job log. Datasets that were on this incremental backup may not be restored to their latest status. Contact INNOVATION for assistance.

**FDR371    FORMAT 4 DSCB NOT FOUND ON RESTORE TAPES**

**Reason:**     FDR or ABR full-volume restore did not find the Format 4 DSCB (first record of the VTOC) on any of the backup tapes. The restore may not be correct. This can occur if the pointer to the VTOC in the disk volume label was invalid at the time of the dump, or if errors occurred reading the backup records containing the VTOC

**Action:**     Contact INNOVATION for assistance.

**FDR372    DISK FORMAT 4 READ ERROR**

**Reason:**     An I/O error occurred reading the Format 4 DSCB (first record on the VTOC) of the output disk volume during a full-volume restore. The pointer to the next available alternate track on the volume, stored in the Format 4, if any, will be lost, but the volume is probably usable. A MINI-DUMP will be printed, showing the I/O error.

**Action:**     Run a COMPAKTOR MAP to check for VTOC errors. Contact INNOVATION for assistance.

**FDR373    UCB VTOC LOCATION WAS NOT UPDATED**

**Reason:**     FDR failed to locate the disk label record on the backup tape (CYL 0 TRK 0 RECORD 3) during a full-volume restore. The volume was restored, but the system pointers to the VTOC, VTOC INDEX, and VVDS were not updated. The output volume may not have a volume label.

**Action:**     Use FDRDSF PRINT TYPE=DSF,DSN=VTOC to print the label track and VTOC to verify that the VOL1 volume label exists on CYL 0 TRK 0; if not, contact Innovation for assistance. If so, vary the volume offline and then remount it to update the system pointers.

**FDR374    BACKUP TAPE DID NOT CONTAIN THE ABR MODEL**

**Reason:**     FDR failed to locate the ABR model DSCB on the backup tape during a full-volume restore.

**Action:**     This is an information message. If the volume being restored to contains an ABR model, FDR retains the model for that volume if the volume serial number is not changed.

**FDR375    ABR MODEL OR VTOC INDEX REWRITE/RENAME FAILED**

**Reason:**     An error occurred when FDR attempted to rewrite the ABR model DSCB, or rename the index VTOC or ABR model. The user may not be authorized to rename this data set.

**Action:**     This pack may need to be reinitialized for ABR processing, or the indexed VTOC may need to be rebuilt with ICKDSF. Contact INNOVATION for assistance.

**FDR376    MULTIPLE ABR MODELS FOUND ON BACKUP DSN=dsname**

**Reason:**     FDR found more than one ABR MODEL DSCB on the backup tape during a full-volume restore. The first one encountered is the one used. The disk volume serial number or the ABR model name may have been changed prior to dump without using the ABR maintenance programs.

**Action:**     SCRATCH the incorrect MODEL using IEHPROGM specifying PURGE on the SCRATCH command. Use program FDRABRM with a REMODEL command ([See Section 55](#)) or the ABR ISPF dialogs ([See Section 92](#)) to reset the remaining ABR MODEL DSCB to the correct Generation and Cycle number. Contact INNOVATION for assistance.

**FDR377    DISK PACK HAS BEEN RELABELLED TO VOL=vvvvvv**

**Reason:**     Information message indicating that the volume serial of the disk being restored to has changed by a full-volume restore.

**Action:**     If disk is shared by multiple systems, it should be varied offline and remounted to the other systems.

**FDR378    RENAME FAILED COMP=cccc CODE=code FROMDSN=tempname  
NEWDSN=permname CLUSTER=clusname**

**Reason:**     On a FDRCOPY MOVE to the same name, the output ICF VSAM cluster was initially created with a temporary name. After the input data set was deleted, an error occurred while renaming the temporary name "tempname" back to the original name "permname", via a catalog ALTER. COMP is the catalog return code and CODE is the catalog reason code as documented for Message IDC3009I in the IBM System Messages manual. Any associated names (cluster, data, index, alternate index) that are not listed in FDR378 messages have been successfully renamed. Unless rename failed for the cluster name, the output data set should be fully usable, under its original cluster name. If rename failed for the cluster name, the output data set may be referenced under the temporary name.

**Action:**     Check the error code and correct if necessary. If desired, contact INNOVATION for assistance.

**FDR390 DSF NO DATA SETS MET SELECTION CRITERIA**

**Reason:** During ARCHIVE or SUPERSCRATCH, no data sets were selected from the current disk volume due to either from SELECT Commands or AUTOMATIC CRITERIA.

**FDR391 OPERATOR REPLIED NO TO ARCHIVE ON UNEXPIRED DSN=dsname**

**Reason:** ARCHIVE selected a data set for ARCHIVE or SUPERSCRATCH whose expiration date has not been reached. The operator replied 'NO' to the request to ARCHIVE.

**Action:** If EXPD=NONE is coded, ABR will not perform this check.

**FDR392 function SELECTED DSN=dsname [(clustername)]**

**Reason:** Message showing which data sets were selected for backup.

**FDR393 USER PASSWORD EXIT FAILED ON DSN=dsname [JOB TERMINATED]**

**Reason:** User data set security exit denied authorization for this data set.

**Action:** On a full volume operation (TYPE=FDR), the entire operation will be terminated. On a data set operation (TYPE=DSF), the data set will be bypassed.

**FDR394 TAPE WAS BYPASSED BY DYNTAPE ERROR DSN=dsname**

**Reason:** ABR attempted to dynamically allocate the medium for the backup file. The allocation failed. The FDR336 message gives the completion code.

**Action:** Determine the reason (such as the device was not available) and retry the operation.

- FDR400 functional description – Module VER 5.2zaab – INNOVATION DATA PROCESSING DATE – yy.ddd PAGE-nnn**  
**Reason:** General page header message for ABR programs other than FDRABR, listing the function, program, version and level, date and page. "z" will be "/" for the base release, and will be a letter (e.g., "A") for subsequent releases. "aa" is a 2-digit number indicating the level of integrated maintenance. "b" will be "P" for a production version, "T" for a trial, and "B" for a beta test version.
- FDR401 PARAM DATA – \* parm-field-data \***  
**Reason:** Displays the program control information specified in the 'PARM=' field of the EXEC statement. This data will not be displayed if program is invoked under TSO.
- FDR402 INVALID CONTINUATION**  
**Reason:** User coded a delimiting comma following the last keyword on a control statement and neglected to provide the next logical record.  
**Action:** Correct and resubmit job.
- FDR403 REQUIRED OPERAND(S) NOT SPECIFIED – cc...cc**  
**Reason:** The operand cc...cc is required for the execution of the command. It must be specified; no defaults are available.  
**Action:** Correct and resubmit job.
- FDR404 cccc CONTROL STATEMENT LIMIT EXCEEDED**  
**Reason:** The maximum number of 'cccc' control statements has been exceeded.  
**Action:** Refer to the section within the User Guide that describes the control statement type listed to determine the maximum number and whether or not the maximum is modifiable.  
 Resubmit the job after modifying the maximum or reducing the number of control statements.
- FDR405 MAXIMUM CONTINUATION COUNT OF nnnn EXCEEDED – COMMAND FLUSHED**  
**Reason:** The user control statement used too many continuations.  
**Action:** Reduce the number of continuations to the value nnnn. Resubmit the job.
- FDR406 CONFLICTING OPERANDS – operands**  
**Reason:** The operands listed conflict with each other and are mutually exclusive. This message is normally followed by FDR407.  
**Action:** Eliminate the conflict by removing one or more operands. Rerun or restart the job.
- FDR407 PARAMETER FIELD | CONTROL STATEMENT ERROR – action taken**  
**Reason:** An error was encountered during the processing of user supplied control statements. Always preceded by one or more messages which define and delimit the error(s):  
 The 'action taken' is one of the following:  
 1. JOB TERMINATED – Processing will stop after the first error has been encountered.  
 2. SKIPPING FOR COMMAND – Processing will continue for all command statements found within the SYSIN data set.  
 3. RE-ENTER COMMAND OR END – Message for a user that has SYSIN data set assigned to a TSO terminal. Re-enter command in error or 'END' to complete the processing.  
**Action:** Correct and resubmit job.
- FDR408 NO CONTROL STATEMENTS WERE FOUND – JOB TERMINATED**  
**Reason:** SYSIN data set is empty OR contained only comment statements ('\*' in column 1).  
 Control statements control all ABR functions and are required.  
**Action:** Correct and resubmit job.
- FDR409 LENGTH OF a...a EXCEEDS THE LENGTH OF b...b**  
**Reason:** The number of significant characters specified for the a...a operand exceeds the number of significant characters specified for the b...b operand. They are interrelated and b...b must be as long as or longer than a...a.  
**Action:** Correct the operands specified and resubmit the control statement.

- FDR410 VOL=v...v ASSUMED FOR DSN=c...c**
- Reason:** A command specified DSN= and did not specify VOL=. The data set specified by DSN= was a cataloged, single-volume data set. The program assumed that the volume where the data set was cataloged was the volume on which the user wanted the command to process the data set.
- Action:** If the assumption was correct, none. Otherwise, the user may wish to reverse the effect of the command (e.g. by issuing RESET ARCHIVE if the original command was ARCHIVE) and then to reissue the original command specifying VOL=.
- FDR411 MISSING ABRINIT, MAINT, OR SELECT CONTROL STATEMENTS(S) – JOB TERMINATED**
- Reason:** FDRABRM was executed with DEFAULT as the only control statement.
- Action:** Check your control statement listing, correct any errors found and resubmit the job.
- FDR412 NO ABRINIT, MAINT, OR SELECT CONTROL STATEMENTS – VTOC UPDATE PROCESSING NOT REQUIRED**
- Reason:** FDRABRM was issued only to initialize a catalog. The only control statements were INITCAT and possibly DEFAULT.
- Action:** None. This condition is not an error.
- FDR413 DSN/DSG INDEX ERROR – error description**
- Reason:** When using the index level option to select data sets or data set groups the user:
1. specified too many index levels. (The maximum is 22).
  2. failed to provide significant data. (The leading periods were followed by a comma or blank).
- Action:** Correct and resubmit.
- FDR414 IGNORED – error description – DSN=c...c**
- Reason:** The device type returned for the data set was not that of a disk device or the data resides on multiple volumes. The processing requested for this data set is not performed.
- Action:** Correct and resubmit job.
- FDR415 ON VOLSER v...v – DSCB tt-ccccchhhrr-CHAINED TO DSCB tt-ccccchhhrr – PROCESSING CONTINUES**
- Reason:** Program detected an invalidly chained DSCB. The volume serial number of the DISK containing the error, the DSCB type and disk address of both the DSCB containing the invalid chain pointer and the DSCB pointed to are printed. Processing of the VTOC continues.
- Action:** This is a serious problem. Determine the data set(s) involved and attempt to correct the DSCB. If unable to determine the cause of the error, contact INNOVATION for assistance.
- FDR416 IMPROPER USE OF OPERAND – o...o reason description**
- Reason:** Program detected that the data associated with the o...o operand is incorrect in the context of use described by the reason description.
- Action:** Eliminate the operand o...o or use it correctly. Rerun or restart the job.
- FDR417 USE OF RESTRICTED FEATURE – f...f FEATURE DISABLED**
- Reason:** Feature f...f has been disabled in the global option table, FDROPT. (Program FDRZAPOP). Attempts to use a disabled feature results in the subcommand being marked in error.
- Action:** Eliminate the restricted feature. Rerun or restart the job.
- FDR418 COMMAND PROCESSING DETECTED ERROR–action taken**
- Reason:** An error was encountered during the processing of the subcommand specified on user supplied control statements. Always preceded by one or more messages that define and delimit the error(s). The action taken is one of the following:
1. RE-ENTER COMMAND OR END – message for user that has SYSIN data set assigned to a TSO terminal. Re-enter command in error or 'END' to complete the processing.
  2. SKIPPING FOR COMMAND – processing will continue for all command statements found within the SYSIN data set.
  3. REVERTING TO SYSIN – the error occurred when reading from an alternate command input source. Processing will continue for commands in the SYSIN data set.
- Action:** Correct and resubmit job.



**FDR419 CAUSED BY THE FOLLOWING COMMAND -**

- Reason:** One or more syntax errors on a remote queue were encountered during the execution of either a 'LIST' or 'REMOVE' subcommand by the remote queue utility, FDRABRUT. Messages defining the errors were listed prior to this message. The command that caused the errors is listed immediately following this message.
- Action:** Execute the REMOVE command specifying ARCHIVE or BACKUP, as required, and include the operand 'ERRORS'. This will remove any queue entries in error.

**FDR420 DDNAME=ddname | VOL=serial PROCESSING BYPASSED | function BYPASSED | - reason  
INITIALIZATION ERROR**

- Reason:** The ddname or volume specified has been examined, one of the following conditions has been detected, and will be paraphrased as the reason description:
1. The VTOC is on cylinder 0, head 0.
  2. DISP of OLD or SHR did not permit the allocation of an ABR model DSCB.
  3. The volume was to be initialized for ABR, but the VTOC contained DSCBs with non-zero value reserved fields and FORCE was not specified. The reserved field that ABR uses is bytes 103 and 104 in the Format 1 DSCB.
  4. The TIOT indicated that allocation has not been completed. This condition should not occur.
  5. The TIOT indicated that more than one (1) unit is referenced.
  6. The device referenced is an unsupported disk device.
  7. The device referenced is not a disk device.
  8. The ddname is a duplicate.
  9. The volume serial number of the disk device was specified in a previous DD statement.
  10. The user requested ABR initialization for the volume serial number but the volume is already initialized.
  11. The volume has not been initialized for ABR.
  12. There was a catalog error establishing or uncataloging an ABR index for this volume serial. The error may have been a security violation. The user initializing the volume must be authorized to create and delete a catalog entry beginning with "FDRABR.Vvolser". Processing continues on the volume.
  13. The volume serial number contains a character that ABR considers reserved.
  14. The maximum number of DD statements or ONLINE volumes has been exceeded.
  15. ARCHIVING has been disabled on this volume.
  16. The Format 4 DSCB is not the first DSCB in the VTOC. The message shows the CCHHR of the DSCB.
  17. There is more than one Format 4 DSCB in the VTOC. The message shows the CCHHR of the second Format 4 DSCB.
  18. Allocation of the ABR model DSCB failed. Message FDR156 follows.
  19. Validation failed for the PRIOROFFSET or PRIORENTRIES values on a MAINT RESET=OLDBKUP operation. They did not match the values stored in the ABR model DSCB for oldbackup storage.
- Action:** If the condition is one that can be corrected, correct it and resubmit the job. If appropriate, call INNOVATION technical support for assistance.

**FDR421 ICF LOCATE ERROR-error description-DSN=c...c  
SMS**

- Reason:** A LOCATE SVC was issued requesting identification of the ICF component or SMS managed data set named by DSN=dsname. The LOCATE either failed or returned a component type or cluster name description that is not currently handled.
1. If the 'error description' is in the form: RETURN CODE rc - REASON IGGOCLaa-crs then the LOCATE failed. The error codes are documented in the IBM System Messages manual under message number IDC3009I.
  2. If the 'error description' is in the form: ENTYPE - c(X'xx') - entry type then the program encountered a type of component entry that it does not presently support.
  3. If the 'error description' is in the form: NAMEDS - c(X'xx') - entry type then the program encountered a type of cluster entry that it does not presently support.
  4. If the 'error description' is in any other form, an error exists in the catalog.
- NOTE: This message only appears if ICFERRPRT=YES has been specified within the FDR global option table or on the control statements. This is only a warning message. The program does not associate the component shown by DSN= with a cluster name, but processing continues.
- Action:**
1. For the first type of error, look up the codes under Message IDC3009I. The most likely cause is that a STEPCAT or JOBCAT DD statement has not been supplied for a user catalog that has entries for components on the volume(s) being processed, and the entries are not ALIASed.
  2. For any other type of errors, contact INNOVATION for assistance.

**FDR422 DDNAME=ddname REFERENCES DATA SET CURRENTLY IN USE-DSNAME=cc...cc**

- Reason:** The data set described by the message is being accessed from another partition, region, or address space.
- Action:** Rerun job when file is available for processing.

- FDR423 CAUTION-DSCBS UPDATED/MODEL NOT CREATED-JFCBDSNM RENAMED/ DELETED BY PRIOR/ CONCURRENT ATTACHED TASK \*\*\***
- Reason:** An error occurred during ABR volume initialization. The temporary data set that was to become the ABR model DSCB was somehow either renamed or deleted after this jobstep started. The other Format 1 DSCBs have been marked for ABR processing, but this is benign, affecting only the next attempt at ABR initialization, which may have to specify FORCE. For further explanation, contact INNOVATION. A return code of 12 is set upon program termination.
- Action:** Rerun ABR initialization for this volume serial number. If the problem is reproducible, trace system activity to determine the culprit. If you have questions, call INNOVATION.
- FDR424 PROCESSING OF VOLUME SERIAL NUMBER vvvvvv COMPLETED-nnn DATA SETS UPDATED**
- Reason:** Informs user of the number of DSCBs changed during initialization or maintenance processing, including the ABR model DSCB.
- FDR425 NOT REFERENCED DURING EXECUTION-ttt=cc...cc**
- Reason:** Identifies control statement type(s) tttt and operand cc...cc coded by the user for which no match was found during execution.
- Action:** Verify all control statements are correct. This control statement did not affect the execution. Results may not be what was expected. Examine output carefully!
- FDR426 PROCESSING OF VOLUME vvvvvv COMPLETED**
- Reason:** The program has successfully completed processing for the disk volume specified in the message.
- FDR427 WARNING ARCHIVE FILE SEARCH TERMINATED AT DATE=yy.ddd**
- Reason:** SDATE or SDAYS was specified on the PRINT ARCHIVE control statement. ABR has terminated the search at this archival date. If data sets were archived prior to this date they will not be selected.
- FDR428 WARNING ONLY nn% OF ARCHIVE CONTROL FILE FREE-REORGANIZATION NEEDED**
- Reason:** The ARCHIVE Control File is becoming full. The default value for the threshold of free space below which this message is produced is 10% of the file.
- Action:** Caution! Reorganize and/or enlarge the ARCHIVE control data set with facilities described in the ABR maintenance section. This must be done with care! The user may change the threshold of free space below which this message is produced by using the REORG% operand of the PRINT ARCHIVE command.
- FDR429 WARNING nn DAYS SINCE VOLUME=vvvvvv PROCESSED BY ABR**
- Reason:** The disk volume specified by the message has not been backed up for the number of days indicated by the message. The message will be printed for any volume that has not been processed by ABR in the number of days specified by the BKDAYS= operand on the PRINT CATLGcommand (default 7). This message can occur for volumes which have been deleted from your system or which are no longer being backed up by ABR.
- Action:** You should probably arrange for a full-volume backup or incremental backup of the volume to be taken very soon. If your full-volume backups are taken at intervals of more than one week, increase the values of BKDAYS=. For volumes which are no longer required to be backed up by ABR, the PURGE BACKUP command of program FDRABRCM ([See Section 55.25](#)) can be used to delete the entries from the ABR catalog.
- FDR430 reason description-DSN=c...c**
- Reason:** User requested ICF VSAM cluster name to be marked (RESET) for archive or backup processing. Message is issued in two (2) lines. The first line of the message identifies the cluster name and the second line of the message identifies the name of the component that will be marked as requested.
- FDR433 MEMORY SPACE REQUEST FAILED BYTES REQUESTED-nnnnnnnnn**
- Reason:** While processing ICF records from the Archive file, nnnnnnn is the memory in HEX needed to process these records which was not available.
- Action:** Increase region size.
- FDR439 VOLSER SELECTION TABLE FULL - MAXONLINE VALUE IS nnnn - REQUEST CANCELLED**
- Reason:** The selection criteria specified by the user caused more than nnnn disk volumes to be tabled for processing. For example, UNITNAME=SYSALLDA caused the volume serial number of each and every mounted disk volume to be tabled or more than nnnn disk volumes were specified by theVOL= operand.
- Action:** Processing is terminated prior to performing the specified request. Rerun the job, specifying the MAXONLINE operand with a value for nnnn that is equal to the number of online disk volumes in the installation.

- FDR440 WARNING BACKUP DATE yy.ddd IS GREATER THAN RUN DATE**
- Reason:** An entry on the ABR backup catalog contains a date greater than the current date known to the Operating System.
- Action:** Check if the date set for use by the Operating System is correct or the ABR run that created the entry was executed with the date set improperly.
- FDR441 XDSNAME SYNTAX ERROR--reason**
- Reason:** In FDREPORT, a XDSNAME= operand on a XSELECT or XEXCLUDE statement violated the syntax rules, as detailed by "reason"
- Action:** Check the syntax rules in [Section 53.20](#) and correct.
- FDR442 LAST CONTROL STATEMENT ADDED TO queue name**
- Reason:** User requested REMOTE QUEUING of commands. The last command control statement was queued as requested.
- FDR443 TAPE XREF TABLE FULL – ENTRY COUNT IS nnnn – ENTRIES WILL BE BYPASSED**
- Reason:** A FDRABRP PRINT BACKUP or FDREPORT requesting information on ABR backups exceeded the tabling capacity of the program. The maximum entries currently available are printed. Tabling of additional ABR backups is bypassed.
- Action:** To increase the maximum number of tapes that can be maintained in the table options MAXTSVX and MAXTCVX can be updated in the FDR/ABR global options table. These can be updated using the ABR ISPF dialog, ISPF option A.I.4.10.  
 MAXTSVX – applies to FDRABRP PRINT BACKUP reports not specifying COMBINE, and to all reports from FDREPORT. The number may be from 10 to 300. The default is 100.  
 MAXTCVX – applies to FDRABRP PRINT BACKUP reports that specify COMBINE. The number may be from 100 to 32000. The default is 1000.  
 The FDREPORT table size can also be overridden by the MAXTAPE=nnn operand on the DEFAULT statement.
- FDR445 RECORD LENGTH ERROR**
- Reason:** During a FDRABRP PRINT TVTOC function, the length field in the FDR control record in the backup data set does not equal the length of the block actually read.
- Action:** Contact INNOVATION for assistance if problem recurs.
- FDR446 1ST RECORD NOT FDR HEADER**
- Reason:** During a FDRABRP PRINT TVTOC function, the first record read from the backup data set was not the expected special FDR header record.
- Action:** A U0626 ABEND will be issued. Check that the input data set is a FDR/DSF/ABR backup and resubmit. Contact INNOVATION for assistance if the problem recurs.
- FDR447 DSF RECORD OUT OF SEQUENCE**
- Reason:** During a FDRABRP PRINT TVTOC function, FDR control records were not in the correct order.
- Action:** A U0626 ABEND will be issued. Contact INNOVATION for assistance.
- FDR448 INVALID DEVICE TYPE CODE IN FDR HEADER**
- Reason:** During a FDRABRP PRINT TVTOC function, the device type code recorded in the FDR header record on the backup data set was not one supported by this version of FDR/DSF/ABR.
- Action:** A U0626 ABEND will be issued. Insure that the version of FDRABRP you are executing is at or above the level that created the backup. Contact INNOVATION for assistance.
- FDR449 REBLK VALUE SPECIFIED TOO SMALL FOR A disktype INCREASING TO nnnnn**
- Reason:** When copying a backup data set, REBLKS= specified a value less than the tracksize of the dumped disk + 28 bytes.
- Action:** FDRTCOPY has automatically increased the output blocksize to the value shown.
- FDR450 TAPEIN SUCCESSFULLY COPIED TO TAPEOUT-BLOCKS READ nnnnnnn BLOCKS WRITTEN nnnnnnn**
- Reason:** One file has been successfully copied from TAPEIN to TAPEOUT (and optionally to TAPE2OUT as well) by FDRTCOPY. Blocks read and blocks written will be the same unless reblocking was requested. This message will be followed by Message FDR615 detailing the data sets read and written.
- Action:** None.

- FDR451 BLOCK GREATER THAN 32760 TO DISK OR REBLKS OR UNBLK ON SPLIT FORMAT...JOB TERMINATED**
- Reason:** FDRTCOPY detected that either:
- 1) The output file is on disk, and the input file was created with FORMAT=NEW (causing blocks greater than 32760), or REBLKS= specified a value greater than 32760.
  - 2) The input file was created using FORMAT=SPLIT and REBLKS= or UNBLK was specified.
- Action:** A U0502 ABEND is issued.
- 1) If the output file is on disk, and the backup being copied is not a dump of a 3380 or 3390, specify REBLKS=32760 or less, or assign the output to tape.
  - 2) If the input file was created with FORMAT=SPLIT, do not specify REBLKS= or UNBLK.
- FDR452 ARCHIVING BYPASSED--reason description**
- Reason:** User requested that the data set printed in the FDR456 message that follows be marked for archive processing, but it was not marked because of the reason description listed. One of the following conditions was detected and will be paraphrased in the reason description:
1. The data set has been referenced within the period specified by the ADATE or ADAYS operand.
  2. The data set is protected from being archived.
  3. The disk volume has archiving disabled.
- FDR453 INDICATOR SET | RESET FOR ARCHIVE | BACKUP**
- Reason:** User requested that the data set printed in the FDR456 message that follows be SET or RESET for remote queue ARCHIVE or BACKUP dump processing
- FDR454 INDICATOR ALREADY | NOT SET FOR ARCHIVE | BACKUP**
- Reason:** User requested that the data set printed in the FDR456 message that follows be SET or RESET for remote queue ARCHIVE or BACKUP processing, but the indicator was ALREADY SET or NOT SET.
- Action:** Check the selection criteria to determine if they were properly specified. Check the processing type to see if it was properly specified. Check to see if the execution is a duplicate of a prior execution. Correct as required.
- FDR455 REBLK VALUE TOO LOW...SYSUDUMP REQUIRED**
- Reason:** Internal error in FDRTCOPY.
- Action:** A U0659 ABEND occurs. Contact INNOVATION for assistance after obtaining a storage dump.
- FDR456 VOL/VOLG=v...v-DSN/DSG=c.....c-DDNAME=ddname**
- Reason:** Identifies a volume, data set, and/or DDNAME, depending on circumstances. Will always be preceded by one of the following messages: FDR452, FDR453, FDR454, or FDR459.
- Action:** If preceded by FDR454, see action for that message, otherwise none.
- FDR457 ENQ FAILED-RC=nn-QNAME=c...c-RNAME=c...c**
- Reason:** An attempt was made to reserve or enqueue on the resource listed. Control should have been returned but an unexpected failure occurred.
- Action:** Usually followed by a U0659 ABEND. Call INNOVATION technical support for assistance AFTER obtaining a storage dump.
- FDR458 DEQ FAILED-RC=nn-QNAME=c...c-RNAME=c...c**
- Reason:** An attempt was made to dequeue the controlled resource listed. Control should have been released but an unexpected failure occurred.
- Action:** Usually followed by a U0659 ABEND. Call INNOVATION technical support for assistance AFTER obtaining a storage dump.
- FDR459 c...c-DENIED BY security-feature reason**
- Reason:** User requested the processing request c...c to be performed on the data set printed in the FDR456 message that follows but the processing request was denied by the security-feature shown (e.g., RACF, PASSWORD, or an exit) for the reason shown.

- FDR460 WARNING–VOLUME CONTAINS MULTIPLE ABR MODEL DSCBS–OTHER ABR FUNCTIONS MAY FAIL**
- Reason:** A VTOC maintenance request detected multiple ABR model DSCBs on the disk volume. Any data set having the following format is considered to be an ABR model DSCB: 'FDRABR.Vvolser'. Note that the DSCB need not have a duplicate data set name, just the same format. Multiple ABR model DSCBs are usually caused by restoring the model DSCB from another volume.
- Action:** Delete the DSCB in error. A rerun of the job is not required.
- FDR461 ABR MODEL FOR VOLUME=vvvvvv NOT AVAILABLE AT THIS TIME. USER MUST SPECIFY 'MAXGEN=' OPERAND.**
- Reason:** An OBTAIN was issued to retrieve information from the ABR model DSCB, but failed for some reason. The volume selected may not be online.
- Action:** The user must use operand 'MAXGEN=' to replace the information normally taken from the ABR model, or supply a DD statement to ensure that the volume is mounted.
- FDR462 CURRENT GEN=gggg/CYCLE=cc ON THE ABR CATALOG IS IN CONFLICT WITH CURRENT GEN=gggg/CYCLE=cc ON THE ABR MODEL FOR VOLUME(vvvvvv). ALL BACKUP ENTRIES FOR THIS VOLUME BYPASSED.**
- Reason:** The current generation and cycle number recorded in the ABR model DSCB on the specified volume, does not match the generation and cycle number of the entry with the most current date in the ABR backup catalog.
- Action:** If the user wishes the utility program to process the volume specified, they must use operand 'CURRINFO=MODEL/CATLG' indicating the correct value.
- FDR463 VOLSER=vvvvvv NOT INITIALIZED FOR ABR–ARCHIVE CONTROL FILE MUST BE ON AN INITIALIZED VOLUME**
- Reason:** The user attempted to create an ARCHIVE control file with either the FORMAT or RESTORE command. For integrity, ABR REQUIRES that the ARCHIVE control file reside on a disk volume that can be processed by ABR. FDRARCH will prohibit the creation of an ARCHIVE controlfile on non-initialized disk volumes.
- Action:** Allocate the ARCHIVE control file on an ABR initialized disk volume and rerun the job.
- FDR464 DDNAME=ddname REFERENCES AN UNSUPPORTED DISK DEVICE**
- Reason:** The disk device allocated to the ddname specified is not within the ABR supported device table.
- Action:** Check the list of supported devices in the introduction of this manual. If appropriate, obtain a list of the UCB for the device in question. Call INNOVATION technical support for assistance.
- FDR465 UNABLE TO OPEN DDNAME=ddname–reason description**
- Reason:** a) ddname printed is missing or misspelled.  
b) OPEN failure occurred for ddname specified in message.  
c) DD statements ABRARCH and ABRREST specified the same DSNAME.
- Action:** If the specified ddname is required for the operation being attempted, correct and resubmit the job. Otherwise, none.
- FDR466 command CANNOT BE PROCESSED**
- Reason:** A command which requires queuing to a remote queue data set cannot be processed because the remote queue data set is not present. Always preceded by FDR465.
- Action:** Include the DDNAME specified in the FDR465 message and resubmit the job including only those commands which failed.
- FDR467 UNABLE TO LOCATE HIGH INDEX OF iiiiii ON CATALOG–JOB TERMINATED**
- Reason:** The catalog manager has returned a condition code other than zero when attempting to locate the high level index specified in the message.
- Action:** It is possible that the user's catalog has not been correctly initialized for ABR processing. This procedure is fully explained in the FDR Installation ([Section 90](#)). If appropriate, call INNOVATION technical support for assistance.
- FDR471 DDNAME=ddname I/O ERROR–SYNAD=cc...cc**
- Reason:** A permanent I/O error was detected on the data set referenced by the ddname.
- Action:** Examine the SYNADAF message to determine the cause of the error. Format of this message is documented in IBM SRL publications. For additional assistance, please call INNOVATION technical support.

- FDR472 DDNAME=ddname DOES NOT REFERENCE AN ARCHIVE CONTROL FILE- DSN=dsname REASON DESCRIPTION-text**
- Reason:** 1) The ARCHIVE DD statement is referencing a non-initialized ARCHIVE control file.  
2) The ARCHIVE control file was written to by other than an ABR system module or the file was written to incorrectly.
- Action:** If the file was erroneously written, you must restore it from the most recent backup. Otherwise, initialize it. Please call INNOVATION technical support if this problem occurs.
- FDR473 ABR INITIALIZATION OF VOLUME vvvvvv INCOMPLETE-RENAME FAILED- RETURN CODE nn-STATUS nn**
- Reason:** During ABR initialization FDRABRM RENAMES the temporary data set allocated by the user to change it into the ABR model DSCB. This function failed. All other functions have been completed, including marking the Format 1 DSCBs for ABR processing. This problem can be caused by another task renaming or scratching the data set between the DEQ of the VTOC and the RENAME.
- Action:** If another task renamed or scratched the data set, rerun the FDRABRM job specifying FORCE on the appropriate ABRINIT control statement or the DEFAULT control statement. If the reason cannot be determined, call INNOVATION technical support for assistance.
- FDR474 DDNAME=ddname REFERENCES DATA SET WITH NO SPACE**
- Reason:** The data set was allocated with SPACE=(CYL,0) or (TRK,0) or (blocksize,0).
- Action:** Scratch the data set, re-allocate with sufficient space and resubmit job.
- FDR475 DDNAME=ddname REFERENCES DSNNAME=dsname-NEED LEVEL PREFIX prefix**
- Reason:** 1) For program FDRARCH, the user coded a non-standard DSNNAME for the ARCHIVE control data set and did not specify NODSNCK. The name must contain an index level of "ARCHIVE"  
2) For program FDRABRUT, the user coded a DSNNAME for a remote queue data set that did not contain the standard index (ABRARDQ, ABRARCH, ABRBKDQ, or ABRREST).
- Action:** 1) Correct the dsname or specify NODSNCK.  
2) None required. If you do not wish to receive this message in future runs, change the name(s) of the remote queue data set(s) to use the standard index(es).
- FDR476 DDNAME=ddname REFERENCES A DEVICE TYPE OTHER THAN DISK**
- Reason:** The ddname listed can only be allocated to a disk device. Check the unit specification in the JCL for errors.
- Action:** Correct and resubmit.
- FDR477 DDNAME=ddname REFERENCES A PREVIOUSLY FORMATTED ARCHIVE CONTROL FILE 'ERASE' MUST BE SPECIFIED TO CONTINUE**
- Reason:** Caution! You have attempted to FORMAT or RESTORE to an initialized ARCHIVE control file!
- Action:** If you want to clear the present file you must code 'ERASE' on the FORMAT or RESTORE control statement.
- FDR478 nn | NO RECORDS function**
- Reason:** Indicates that FDRARCH has performed the requested 'function' on 'nn' records.  
If NO RECORDS is printed, the function was not performed, probably due to a control statement specification.
- Action:** If NO RECORDS, correct the error and submit again.  
If NO RECORDS SELECTED FOR MAINTENANCE is printed, FDRARCH was invoked from FDRTCOPY when copying an archive backup, to update the Archive Control File to point to the output file(s), but no records were found on the Archive Control File which pointed to the input backup files being copied. This could occur if the input files had expired and being purged from the ACF, or if the input files had been previously copied so that the ACF no longer pointed to them.
- FDR479 nn | NO RECORDS MERGED - FROM DSN=dsname | TOTAL OF ALL INPUT FILES**
- Reason:** Indicates that the number of records read by FDRARCH during a MERGE function, for each source data set and total. If NO RECORDS is printed, no merge was performed, probably due to a control statement or JCL specification.
- Action:** If NO RECORDS, correct the error and submit again.

**FDR480 DDNAME=ddname REFERENCES AN EMPTY DATA SET**

**Reason:** The tape from which the ARCHIVE control file was to be restored contained no data. The tape went to immediate EOF.  
**Action:** Verify that the tape specified is correct. If you are using other than SL tapes, check the LABEL= parameter. Correct the JCL and resubmit the job.

**FDR481 DDNAME=ddname DOES NOT REFERENCE A BACKUP COPY OF AN ARCHIVE CONTROL FILE**

**Reason:** The data set referenced by the ddname does not contain a backup copy of the ARCHIVE control file in FDRARCH format.  
**Action:** Check JCL statements and correct the DD statement specified in the message. FDR/DSF copies of the ARCHIVE control file cannot be restored by FDRARCH. They can be restored with the RESTORE TYPE=ABR command of FDRABR.

**FDR482 DDNAME=ddname DOES NOT REFERENCE A TAPE DEVICE-REQUIRED FOR DUMP/REORG/RESTORE**

**Reason:** A backup data set must be created on tape during execution of the DUMP or REORG commands. A restore of a backup data set created by the execution of the DUMP or REORG commands of FDRARCH must be performed.  
**Action:** Correct JCL statement in error.

**FDR484 INTERNAL LOGIC ERROR-JOB TERMINATED**

**Reason:** The program has encountered an illogical condition.  
**Action:** Call INNOVATION for technical assistance after obtaining a storage dump.

**FDR485 SORT FAILURE HAS OCCURRED RC=nnn-COMMAND CANCELLED**

**Reason:** Your installation's sort product has returned a condition code other than zero. The return code problem description can be found in the sort manual supplied with the sort program product. In many cases the sort program will provide an error message on ddname SYSOUT and/or on the system console. The processing of the command listed in the message has been cancelled. Other commands may process successfully.  
**Action:** If you cannot correct the problem from this information, call INNOVATION for technical assistance.

**FDR486 VTOC READ ERROR-VOLSER=vvvvvv-SEEK ADDRESS cccchhhh - action description**

**Reason:** An I/O error was encountered while reading the VTOC of a disk volume. Depending on user options, processing may continue bypassing remainder of VTOC or terminate with a storage dump.  
**Action:** Call INNOVATION for technical assistance after obtaining a storage dump as a serious problem may exist. A COMPAKTOR MAP may help to diagnose the problem.

**FDR487 VTOC WRITE ERROR-VOLSER=vvvvvv-SEEK ADDRESS cccchhhh - action description**

**Reason:** An I/O error occurred while rewriting the VTOC of a disk volume. Depending on user options, processing may continue bypassing the remainder of the VTOC or terminate with a storage dump. A COMPAKTOR MAP may help to diagnose the problem.  
**Action:** Call INNOVATION for technical assistance after obtaining a storage dump as a serious problem may exist.

**FDR488 VTOC OUT OF SEQUENCE-VOLSER vvvvvv-SEEK ADDRESS cccchhhh-action description**

**Reason:** ABR VTOC read routines check the CCHHR portion of the count field for continuity. During this check, one of the records was found to be in error. This message is usually followed by a diagnostic MINI DUMP. Depending on user options, processing may continue, bypassing the remainder of the VTOC, or may terminate with a storage dump.  
**Action:** Check the MINI DUMP for the record in error. Check the volume for hardware problems. The VTOC may be corrupted; a COMPAKTOR MAP may help to diagnose the problem. If all else fails, call INNOVATION technical support for assistance.

**FDR489 NO DISK | TAPE PREFIXED DDNAMES PRESENT OR SUITABLE FOR PROCESSING**

**Reason:** a) No DISKxxxx DD statements were found in the JCL stream.  
b) The DISKxxxx DD statements did not reference acceptable direct access devices or volumes.  
c) No TAPExxxx prefixed DD statements were found in the JCL stream when processing 'PRINT TVTOC' command.  
**Action:** This message may be preceded by one or more FDR420 messages describing error conditions. Correct those conditions or include the appropriate prefixed DD statements and resubmit the job.

- FDR490 PROCESSING TERMINATED WITHOUT FILE/VTOC UPDATE/LIST**  
**Reason:** The processing program was unable to complete any of the functions requested. Always preceded by one or more error messages.  
**Action:** Correct error conditions noted and resubmit the job.
- FDR491 function FUNCTION STARTED-hh.mm.ss**  
**Reason:** Identifies type of function and time the function started.
- FDR492 function FUNCTION ENDED-hh.mm.ss CONDITION CODE-nnnn**  
**Reason:** Identifies type of function and time the function ended. The return code is printed if non-zero.
- FDR493 function-BYPASSED-PRIOR FUNCTION TERMINATED WITH KEYWORD OR COMMAND DETECTED ERROR**  
**Reason:** A previous command upon which this function may be dependent encountered serious errors.  
**Action:** Correct the condition and reexecute.
- FDR494 WARNING INFORMATION REQUESTED NOT AVAILABLE FOR PROCESSING**  
**Reason:** The information the user requested could not be located for print processing.  
**Action:** Verify all selection control statements are correct.
- FDR495 NO DATA SETS MATCHED SELECTION CRITERIA-VOLSER=vvvvvv**  
**Reason:** The selection criteria specified did not cause any data sets to be selected from the disk volume with a volume serial number of vvvvvv or from all disk volumes selected.  
**Action:** None. This message is informative only.
- FDR497 program (version) ABNORMALLY TERMINATED DUE TO KEYWORD/COMMAND DETECTED ERRORS**  
**Reason:** The common parsing routine encountered errors in parsing the user specified control statements. In addition, the user has set the option KWDC=ABEND via program FDRZAPOP requesting that programs that encounter parsing related errors abnormally terminate rather than issue a return code. Always preceded by one or more error description messages.  
**Action:** Previous messages describe the errors; see those messages for further details.
- FDR498 program (version) PROCESSING COMPLETED WITH ERRORS**  
**Reason:** The program listed in the message completed the required processing but recoverable errors were encountered.  
**Action:** Check the output, correct and rerun or restart as appropriate.
- FDR499 program (version) PROCESSING COMPLETED**  
**Reason:** The program listed in the message completed the required processing.
- FDR501 REMOVED FROM ddname-control statement**  
**Reason:** The user requested that certain control statements be removed from the remote queue data set identified by the ddname.
- FDR502 SIMULATED REORGANIZATION-function BYPASSED SIMULATED**  
**Reason:** The user requested a simulated reorganization of the ARCHIVE control file. A function usually done during a REORG was bypassed or simulated.



**FDR503 reason ARCHIVE ENTRY DROPPED-DSNAME=dsname**

**Reason:** The entry for data set name dsname has been dropped from the ARCHIVE control file because it was:

- RESTORED – entry has been marked as restored to disk from ARCHIVE.
- EXPIRED – all ARCHIVE dump tapes have expired.
- DELETED – entry has been marked for deletion.
- ICF COMP – component of dropped cluster
- ICF ERR – component without any related cluster entry
- IFNOTAUT – entry not marked as ARCHIVED for auto recall.
- IFNOTCAT – entry not currently cataloged for auto recall.
- MAXGENER – entry exceeded the maximum number of ARCHIVED copies of a specific generation group that can reside in the ARCHIVE Control File at any one time.
- MAXOCCUR – entry exceeded the maximum number of ARCHIVED copies of a specific data set that can reside in the ARCHIVE Control File at any one time.

**FDR504 DDNAME=ddname REFERENCES SUCCESSFULLY RESTORED | MERGED | REORGANIZED ARCHIVE CNTL FILE**

**Reason:** The Archive Control File indicated by ddname has been restored, reorganized, or merged from other files.

**FDR505 DDNAME=ddname REFERENCES ARCHIVE CNTL FILE-DEVICE=ttttt-VOLSER=vvvvvv-DSN=dsname**

**Reason:** Describes the device type, disk volume serial number, and the first 26 bytes of the data set name of the ARCHIVE control file being processed.

**FDR506 SPACE AVAILABLE FOR nnnnnn ADDITIONAL ARCHIVED DATA SETS**

**Reason:** Lists the remaining capacity of the ARCHIVE control file identified by Messages FDR504 and FDR505.

**FDR507 DDNAME=ddname REFERENCES A BACKUP COPY OF DSNAME=dsname**

**Reason:** A reorganization or a dump of an ARCHIVE control file was requested by the user. The dump of the ARCHIVE control file dsname was successfully completed to the ddname listed.

**FDR508 RECFM=cc,BLKSIZE=nnnnnn**

**Reason:** A reorganization or a dump of an ARCHIVE control file was requested by the user. The dump of the ARCHIVE control file has a record format of cc and a blocksize of n...n. Always preceded by Message FDR507.

**FDR509 REJECTED-error description-VOL=vvvvvv ADATE=yy.ddd DSNAME=dsname**

**Reason:** User has requested that one or more data set entries within an ARCHIVE control file be marked for special processing or have a special processing indicator removed. The request was rejected for the reason given for the data set entry dsname that was ARCHIVED on date yy.ddd from disk volume vvvvvv.

The error description may be one of the following:

- ALREADY SELECTED – User requested a data set entry be marked for ABR ARCHIVE restore. It was already so marked.
- EXPIRED TAPE – User requested a data set entry be marked for ABR ARCHIVE restore but the tape containing the data set has expired.
- ALREADY DELETED – User requested a data set entry be marked for deletion from the ARCHIVE control file. The data set entry is already marked for deletion.
- ICF TABLE FULL – the table used for associating ICF VSAM clusters and components has overflowed.

**Action:** Check the selection criteria to determine if they were properly specified. Check the processing type to see if it was properly specified. Check to see if the execution is a duplicate of a prior execution. If ICF TABLE FULL, an FDR670 message will have been issued previously. See the documentation for the FDR670 message and take the action indicated.

**FDR510    action description-VOL=vvvvvvv ADATE=yy.ddd DSNAME=dsname**

**Reason:**        User has requested that one or more data set entries within an ARCHIVE control file be marked for special processing or have a special processing indicator removed. The requested action (described by action description) was successfully performed for the data set entry dsname that was ARCHIVED from disk volume vvvvvv on date yy.ddd. This message may also appear during a REORG operation.

The action description may be one of the following:

- |                               |   |   |
|-------------------------------|---|---|
| SELECTED FOR ARCHIVE RESTORE  | – | User requested a data set entry be marked for ABR ARCHIVE restore.  |
| EXCLUDED FROM ARCHIVE RESTORE | – | User requested a data set be marked for exclusion from ABR ARCHIVE restore.   |
| SELECTED FOR RECORD DELETION  | – | User requested a data set entry be marked for deletion from the ARCHIVE control file.   |
| DELETION FROM ARCHIVE RESET   | – | User requested a data set entry be reset for deletion from the ARCHIVE control file.  |
| UNCATALOGED FROM AUTO RECALL  | – | User requested a reorganization of the ARCHIVE control file. The specified data set entry which was being dropped from the file, had been marked for Auto Recall. Therefore the program uncataloged the data set. |

**FDR511    RECALL DATA SET LOCATE | UNCATALOG | RECATALOG FAILED-DSNAME=dsname**

**Reason:**        User requested a reorganization of the ARCHIVE control file. Data set entries that are to be dropped during the reorganization but are marked for auto recall normally are uncataloged. The catalog action indicated failed for data set entry dsname. This message is always followed by Message FDR516 or FDR674 unless IGNORED is printed. If IGNORED is printed the message contains an additional line stating:

                    GENERATION DATA GROUPS NOT CORRECTLY  
                    SUPPORTED BY THE RECAT SUBCOMMAND.

This condition is only possible if SERVICE=CREATE was specified. FDRARCH can correct or modify existing catalog entries for generation data groups but does not currently have the logic to properly create entries without the potential of causing valid existing catalog entries to be deleted.

**Action:**        See Message FDR516 or FDR674.

**FDR512    WARNING-IMBEDDED INACTIVE BLOCK-ENTRY COUNT=nnn-RBN=rrr**

**Reason:**        The DUMP function of the ARCHIVE utility (FDRARCH) encountered an imbedded block within an ARCHIVE control file that is not marked as containing data. The number of entries within the block is printed as nnn. The relative block number within the ARCHIVE control file is printed as rrr.

**Action:**        This is a serious error. Call INNOVATION for technical support.

**FDR513    TAPE TABLE CONTAINS nnnnnn ENTRIES  
VOLSER**

**Reason:**        User requested uncatalog of ARCHIVE dump tapes during reorganization of the ARCHIVE Control File (UNCAT=YES). The resulting tape table contains nnnnnn entries. The table of tape volumes (relative to the tape table) contains nnnnnn entries.

**FDR514    ARCHIVE TAPE SCRATCH | CATALOG | UNCATALOG FAILED-DSNAME=dsname**

**Reason:**        User requested uncatalog processing of ARCHIVE tape entries that are no longer referenced and specified that catalog messages are to be printed. A catalog action failed. If the action is UNCATALOG, an ARCHIVE tape data set that is no longer required was to be uncataloged. If action is CATALOG, an ARCHIVE tape data set that is no longer required had been uncataloged, but then it became necessary to catalog another ARCHIVE tape data set on the same volume (Cataloging of ARCHIVE tape data sets is done only to provide an entry in the catalog for a given tape volume serial and is designed for those installations having a tape management system). SCRATCH is done for archive backup files on disk. Always followed by Message FDR516, FDR526 or FDR674.

**Action:**        See Message FDR516, FDR526 or FDR674.

- FDR515 ARCHIVE TAPE *SCRATCHED* | *CATALOGED* | *UNCATALOGED* VOL=volser-DSNAME=dsname**  
**Reason:** User requested uncatalog processing of ARCHIVE tape entries that are no longer referenced and specified that catalog messages are to be printed. If action is UNCATALOGED, an ARCHIVE tape data set that is no longer required has been uncataloged. If action is CATALOGED, an ARCHIVE tape data set that is no longer required had been uncataloged, but then it became necessary to catalog another ARCHIVE tape data set on the same volume (see Message FDR514 for explanation). If action is SCRATCHED, an expired disk archive file was scratched.
- FDR516 CAMLST REGISTERS – R0=xxxxxxxx R1=xxxxxxxx R15=xxxxxxxx**  
**Reason:** A CAMLST request failed. The type of CAMLST function (shown in immediately preceding message) and the registers make diagnosing the problem relatively simple. The return codes from catalog management are documented in the IBM manuals SPL: DATA MANAGEMENT for MVS or CATALOG ADMINISTRATION GUIDE for MVS/XA and MVS/ESA.  
**Action:** Check the return code(s) and take corrective action if the error is apparent or call INNOVATION technical support for assistance.
- FDR517 DSN-dsname FNUM-nnn**  
**Reason:** User requested the optional listing of the tape table during reorganization. Tape data set dsname starts at file number nnn. Followed by Messages FDR518 and FDR519 which further describe the tape table entry.
- FDR518 USE-nnnnnn CATALOGED-ccc DEVICE-dddddd**  
**Reason:** User requested the optional listing of the tape table during reorganization. Describes further the tape table entry named on the preceding FDR517 message. The data set contains nnnnnn active ARCHIVED data sets, is or is not currently cataloged and is on a device type of ddddd.
- FDR519 VOLS-vvvvvv ...**  
**Reason:** User requested the optional listing of the tape table during reorganization. Describes further the tape table entry named on the preceding FDR517 message. The data set resides on the volume(s) indicated.
- FDR520 PRINTING FROM DEVICE TYPE ttttt TO OUTPUT DDNAME ddname**  
**Reason:** User has requested FDRDSF PRINT processing from device type ttttt to the ddname listed.
- FDR521 CYLINDER cccc TRACK tttt – RECORD ZERO cccchhhrrkllll – DATA xxxxxxxxxxxxxxxxx**  
**Reason:** Print request processing program identification for current location on disk volume being printed.
- FDR522 COUNT FIELD cccchhhrrkllll – optional information**  
**Reason:** Print request processing program identification for the current disk record being printed. The optional information could contain:  
 END OF FILE –end of data set or number  
 TRACK OVERFLOW–track overflow record
- FDR526 REGISTER 15=xxxxxxxx-nnn VOLUMES REFERENCED.  
 VOLSER=vvvvvv – DEVICE TYPE=ttttt RETURN CODE=rrrr**  
**Reason:** Follows Message FDR514 for SCRATCH failure. xxxxxxxx is the SCRATCH return code in register 15. The second line of the message is repeated for each volume that the data set being scratched resides on, giving the scratch return code for the volume. Code 7 indicates that SCRATCH failed because the data set was in use. Code 2 or 8 indicates a security violation.  
**Action:** Check the return code(s) and take corrective action if the error is apparent or call INNOVATION technical support for assistance.

- FDR530    MODULE mmmmmmmmm NOT FOUND–SYSLIB=dsname**
- Reason:**     Program issued a BLDL for the module mmmmmmmmm in the data set referenced by DDNAME SYSLIB. The module was required to support all processing functions.
- Action:**     Verify that the data set name specified on the SYSLIB DD statement was the correct one. If incorrect, change and resubmit the job. If the data set name is correct, check the FDRABR product install listing to see if all steps were executed. If required, run the installation steps missed. If all else fails, contact INNOVATION for technical assistance.
- FDR531    MODULE mmmmmmmmm CONTAINS NO TEXT RECORDS–SYSLIB=dsname**
- Reason:**     Program attempted to read the module mmmmmmmmm in the data set referenced by SYSLIB. The module was required to support all processing functions but, in reading the module, no text records were found.
- Action:**     Verify that the data set name specified on the SYSLIB DD statement was the correct one. If incorrect, change and resubmit the job. If the data set name is correct, check the FDRABR product install listing to see if all steps were executed. If required, run the installation steps missed. If all else fails, contact INNOVATION for technical assistance.
- FDR532    MODULE mmmmmmmmm I/O ERROR READING–SYSLIB=dsname**
- Reason:**     Program attempted to read the module mmmmmmmmm in the data set referenced by SYSLIB. The module was required to support all processing functions but, in reading the module, an I/O error was encountered.
- Action:**     Check the SYNAD error message(s) and MINI DUMP produced to see if the cause of the error is an obvious one. If so, correct and resubmit the job. If all else fails, contact INNOVATION for technical assistance.
- FDR533    MODULE mmmmmmmmm I/O ERROR WRITING–SYSLIB=dsname**
- Reason:**     Program attempted to rewrite the module mmmmmmmmm in the data set referenced by SYSLIB after performing required changes. An I/O error occurred during the rewrite operation.
- Action:**     This is a serious error which may result in the load module library referenced by SYSLIB being unusable. Check the SYNAD error message(s) and the MINI DUMP produced looking for an obvious cause of the error condition. If necessary, restore or recreate the library. Rerun the job. If the condition reoccurs, contact INNOVATION for technical assistance.
- FDR534    SYSLIB OPEN FAILURE–AVAILABLE COMMANDS: HELP,END**
- Reason:**     The required SYSLIB DD statement could not be opened. Commands which access modules in the SYSLIB data set cannot be executed.
- Action:**     If the SYSLIB DDNAME is required for the operation being attempted, correct and resubmit the job. Otherwise, none.
- FDR535    mmmmmmmmc MODULE READ UNSUCCESSFUL–ffffff BYPASSED**
- Reason:**     The user requested function fffffff be performed against module mmmmmmmmm but the module was not successfully read. This message will be preceded by Message FDR530, FDR531, or FDR532 detailing the reason the read failed.
- Action:**     See Message FDR530, FDR531, or FDR532, as required.
- FDR536    mmmmmmmmm CONTAINS NO EMPTY SLOTS–UPDATE BYPASSED**
- Reason:**     The user attempted to add additional entries to the protection list module, mmmmmmmmm. All available slots within the module were in use. The complete update was bypassed. Subsequent adds may be able to be inserted, however, as the slots are in card image format.
- Action:**     Print the protection list module with the FDRZAPOP print command. Eliminate duplicate or redundant entries. If this is not possible, the INSTALLATION CONTROL LIBRARY contains the source code for these tables, in order to expand the module.
- FDR537    mmmmmmmmm CONTAINS NO PROTECTED DSNAMES/DSGROUPS/VOLUMES**
- Reason:**     The user attempted to print the entries in the protection list module mmmmmmmmm but there were none.
- Action:**     None. This message is informative only.

- FDR538 MODULE mmmmmmmmm WRONG VER/LEVEL-SYSLIB=dsname**  
**Reason:** Program read the module mmmmmmmmm from the data set referenced by SYSLIB. The module was not at the current version and/or level required for execution.  
**Action:** Verify that the data set name specified on the SYSLIB DD statement was the correct one. If incorrect, change and resubmit the job. If the data set name is correct, check the FDRABR product install listing to see if all steps were executed. If required, run the installation steps missed. If all else fails, contact INNOVATION for technical assistance.
- FDR539 MODULE mmmmmmmmm fffffff-SYSLIB=dsname**  
**Reason:** The module mmmmmmmmm from the data set referenced by DDNAME SYSLIB has had function fffffff performed as requested by the user.  
**Action:** None. This message is informative only.
- FDR540 ccccccc CONTAINS INVALID CHARACTERS-ZAP REJECTED**  
**Reason:** The value specified for the operand ccccccc contained one or more characters that were not A-Z, 0-9, \$#@.  
**Action:** Remove the offending character(s) and resubmit the job.
- FDR541 ALLINDX CREATES cccccccc NAME GT nn CHARACTERS-ZAP REJECTED**  
**Reason:** The value specified for the operand ALLINDX, when used to replace the first index of the operand cccccccc, creates a character string longer than the limit nn.  
**Action:** Shorten the value of ALLINDX by specifying fewer characters or change the value of operand cccccccc. Resubmit the job, if required.
- Note: Other operands may have been changed by the ALLINDX value.**
- FDR542 ccccccc CONTAINS INVALID INDEX STRUCTURE-ZAP REJECTED**  
**Reason:** The value specified for the operand ccccccc contains two (2) or more consecutive periods (..) in violation of operating system data set naming conventions.  
**Action:** Correct the error(s) and resubmit the job.
- FDR543 ccccc DOES NOT CONTAIN CHARACTER STRING rrrrrr-ZAP REJECTED**  
**Reason:** The value specified for the operand ccccc does not contain the character string rrrrrr as the start of an index level (i.e.: if rrrrrr is ARCHIVE, then valid ARCDSDN values would be 'SAM.ARCHIVE1' or 'FDRABR.CURRENT.ARCHIVE.DATASET').  
**Action:** Correct the error(s) and resubmit the job.
- FDR544 ccccccc REJECTED-EXCEEDS MODIFIABLE PORTION OF FDROPT**  
**Reason:** The length of the value specified for the operand ccccccc taken in conjunction with the offset operand exceeds the modifiable portion of FDROPT.  
**Action:** Correct the error(s) and resubmit the job.
- FDR545 VERIFY FAILED-CHAR/HEX PRINT FORCED**  
**Reason:** The VERIFY of existing contents failed. A character/hex print of the module FDROPT is produced. Always preceded by Message FDR544.  
**Action:** See Message FDR544.
- FDR546 CYCLE TABLE FIELD EXCEEDED - MIN OFFSET - nnn/MAX ENTRIES - eee**  
**Reason:** The length of the value specified for the operand OLDBENT, taken in conjunction with the value of the operand OLDBOFF exceeds the limits of the OLDBACKUP table.  
**Action:** Correct the error(s) and resubmit the job.

- FDR547 FDRCPKUM UNMOVABLE TABLE HAS ONLY nnn REMAINING BYTES – UPDATED BYPASSED**
- Reason:** The user attempted to add an entry to the COMPAKTOR unmovable data set name/group list in module FDRCPKUM. The number of bytes required by the data set name or group required more bytes than were present. Only nnn bytes remain. Other entries may fit.
- Action:** Print the COMPAKTOR unmovable data set name/group list and eliminate duplicate or redundant entries. If this is not possible, the INSTALLATION CONTROL LIBRARY contains the source code for the unmovable table (FDRCPKUM), in order to expand the module.
- FDR548 FDRCPKUM CONTAINS NO UNMOVABLE DATA SET NAMES/GROUPS**
- Reason:** The user attempted to print the COMPAKTOR unmovable data set name/group list in module FDRCPKUM but there were no entries.
- Action:** None. This message is informative only.
- FDR549 PRINTING cccccccc-SYSLIB=dsname**
- Reason:** The module cccccccc from the data set referenced by ddname SYSLIB is being printed as requested by the user.
- Action:** None. This message is informative only.
- FDR550 ERRORS ENCOUNTERED DURING EXECUTION-REWRITE CANCELLED**
- Reason:** One or more modules from the SYSLIB data set were scheduled for rewrite at termination or by the execution of a REWRITE command. However, previous commands failed to complete successfully. The errors encountered have been documented by error messages.
- Action:** Correct the error conditions documented by the error messages and resubmit the job.
- FDR552 MAXIMUM VOLSER COUNT OF nnnnn EXCEEDED-DUPLICATE VOLSER MAY BE PRINTED**
- Reason:** The user requested 'PRINT VOLSTAT' processing that resulted in the maximum number of disk volumes, either virtual or real, being exceeded. In systems other than MVS/XA this can result in duplicate status being printed for the same volume serial number since more than one path (and therefore more than one UCB pointer) may be generated for the disk drive that contains the disk volume.
- Action:** Increase the value of MAXONLINE in the FDR/ABR global option table, using ISPF option A.I.4.10. The default is 256.
- FDR553 TAPE TABLE FULL – ENTRY COUNT IS nnnnn – NO ADDITIONAL ENTRIES WILL BE DROPPED**
- Reason:** A REORG of the ARCHIVE control file has been requested but the maximum number of ARCHIVE tapes to be tabled has been set to a value less than the actual requirements. When no more tapes can be tabled, no more entries will be dropped from the ARCHIVE control file.
- Action:** Rerun the REORG as soon as possible. Future occurrences of this condition may be avoided by executing the REORG command specifying the operand MAXTREORG with a value greater than the number of the entries shown in the message. The value must be a number from 100 to 32000. The value of MAXTREORG can be changed permanently in the FDR/ABR global option table on ABR ISPF panel A.I.4.6.
- FDR554 NULL cccccccc SUBCOMMAND-SUBCOMMAND IGNORED**
- Reason:** User specified subcommand cccccccc but did not specify any operands. The subcommand will not be accepted for processing unless one (1) or more operands are specified.
- Action:** The subcommand cccccccc will not be processed. Respecify the subcommand and, if required, resubmit the job.
- FDR555 aaaaaaaaa/OFFSET MUST BOTH BE SPECIFIED-SUBCOMMAND IGNORED**
- Reason:** The operand aaaaaaaaa must be used in conjunction with OFFSET. No defaults are possible for the missing operand.
- Action:** Specify the missing operand and, if required, resubmit the job.

<b>Reason:</b>	The combined length, either implied or specific, of operand aaaaaaaa and the corresponding offset location exceed the length of the data cccccccc to be processed. The subcommand will be ignored.
<b>Action:</b>	Determine if the operand aaaaaaaa or its corresponding offset caused the error condition. Correct the error and, if required, resubmit the job.

<b>Reason:</b>	The user specified an unequal number of length and offset entries. The relationship between length and offset must be maintained at a one (1) to one (1) ratio. The subcommand is ignored.
<b>Action:</b>	Correct the error condition and, if required, resubmit the job.

<b>Reason:</b>	The field name cccccccc is beyond the fixed portion of the record and, therefore, cannot be used as a sort control field. The subcommand is ignored.
<b>Action:</b>	Remove the offending field name from the sort field selection list and, if required, resubmit the job.

<b>Reason:</b>	The field name ccccccc was previously specified in the list of fields to be printed on a custom report. It cannot be specified more than once for any given report. The subcommand is ignored.
<b>Action:</b>	Remove the offending field name from the report field selection list and, if required, resubmit the job.

<b>Reason:</b>	While opening input files for an ARCHIVE control file MERGE, FDRARCH discovered errors either opening or validating the names or contents of one or more of the input ARCHIVE files. Other messages will define the exact errors.
<b>Action:</b>	See the action for the other error messages.

**Reason:** User specified the obsolete operand fffffff. Rather than bypass the command, the operand was converted internally to a currently supported operand that will perform the same function.

**Action:** None.

<b>Reason:</b>	The required operand(s) listed in the character string fffffff were not specified. If ASSUMED is displayed, they were not required by previous releases of the product. The operand that corresponds to the default processing option in prior releases was assumed. If IGNORED is displayed, the related operand is necessary for proper execution. As a result the ccccccc operand has been ignored for this execution.
<b>Action:</b>	If ASSUMED is displayed, none.If IGNORED is displayed, add the required operand and re-execute.

<b>Reason:</b>	The data set indicated is the new default for the file type indicated by fffffff. A CAMLST LOCATE was issued to verify that the data set is cataloged as required for FDRABR to dynamically allocate. The data set name was not found by LOCATE. Message FDR516 detailing the CAMLST return code(s) is always printed following this message.
<b>Action:</b>	See Message FDR516. This is only a warning message. The data set name listed has become the new name of the indicated default.

**Reason:** The selection criteria specified by the user caused more than nnnnn SMF records to be tabled for processing.

**Action:** No additional records are tabled for processing while processing of the records already tabled continues. For a more complete report, rerun the job with a larger value specified for the MAXSELECT operand.

**FDR571 VSAM ERROR – DDNAME=ddname – error description – R15=xxxxxxx – CODE=xxxxxxx**

**Reason:** The listed error was encountered attempting to process a VSAM SMF recording file. The error description will be one of the following:  
CLOSE failed – close of VSAM data set  
GENCB failed – generation of a control block  
GET failed – get next record  
OPEN failed – OPEN of VSAM data set

**Action:** Check the values of R15 and CODE against the return codes listed in the 'VSAM REFERENCE FOR MVS/370 DFP', 'VSAM ADMINISTRATION: MACRO INSTRUCTION REFERENCE FOR MVS/XA', or 'OS/VS VIRTUAL STORAGE ACCESS METHOD PROGRAMMER'S GUIDE', to determine the cause of the error. If possible, correct and re-execute the job. Call INNOVATION for additional assistance.

**FDR572 SMF RECORDS – READ...nnnnnnnn USED...nnnnnnnn DROPPED...nnnnnnnn**

**Reason:** Documents the SMF records processed as follows:  
READ – number of SMF records read from the input data set. May not reflect the total number of records in the data set if an FDR570 message was issued.  
USED – number of SMF records selected from the input data set by the criteria specified by the user.  
DROPPED – number of SMF records dropped from the input data set because of length checking, or other user specified criteria.

**Action:** None, information only.

**FDR573 FOLLOWING SMF RECORD DROPPED - LENGTH CHECK**

**Reason:** User specified the CHECKLENGTH operand, causing all SMF records selected to be checked against a table of minimum lengths. This record failed the length check. The first 32 bytes of the record are printed in hexadecimal.

**Action:** Use the keyword RECSIZE=nn on the report control statement to specify an appropriate size.

**FDR574 DD NOT FOUND–DDNAME=ddname–ffffff REQUEST DENIED**

**Reason:** The ddname printed is required as either input to or output from a processing program performing function fffffff, but is either missing or misspelled.

**Action:** Correct the error and resubmit the job.

**FDR575 FAMS ACCESS ERROR – error description – DSN=dsname**

**Reason:** An access request was made via the FAMS facility to gather information about a PDSE. The access request failed.

**Action:** Contact INNOVATION Technical Support for assistance.

**FDR576 DSN NOT ON VOLSER vvvvvv–ffffff REQUEST DENIED–DSN=dsname**

**Reason:** A processing program, prior to performing the requested function fffffff, issued an OBTAIN for the data set name indicated on volume vvvvvv. The OBTAIN returned a non-zero return code. Message FDR516 is also issued.

**Action:** See Message FDR516.

**FDR577 IAM LOCATE ERROR – error description – DSN=dsname**

**Reason:** A special form of the LOCATE svc was issued through the IAM/VIF interface to gather information about an IAM data set. The locate failed with an unexpected return code.

**Action:** Contact INNOVATION Technical Support for assistance.

**FDR585 RECORD SIZE nnnnn EXCEEDS MAXIMUM DEVICE BLOCK SIZE**

**Reason:** The number of data bytes necessary to construct the desired output record form FDREPORT exceeds the maximum device block size on the device assigned.

**Action:** Change to a different output device or remove some of the field names to reduce the size of the output record.



**FDR586 output service CANCELLED – AUDIT CONTINUES**

**Reason:** User has selected an FDREPORT output service that is not available, usually because of a missing or incorrectly specified DD statement. This message will probably be preceded by an FDR465 detailing the ddname in error.

**Action:** Follow the instructions for the FDR465 message.

**FDR587 SUMMARY VOLSER TABLE FULL – ENTRY COUNT IS 5000 – NEW VOLUMES WILL NOT BE SELECTED**

**Reason:** DISABLE=NEWSUMFORMAT has been specified by the user along with SUM=YES and DATATYPE=EXTRACT or DATATYPE=ARCHIVE. The selection criteria specified by the user caused more than 5000 disk volumes to be tabled for summary processing.

**Action:** Processing of this volume is bypassed. Volumes tabled prior to receiving this error message will be processed. For a more complete output, rerun the job specifying ENABLE=NEWSUMFORMAT. Old summary processing is limited to 5,000 disk volumes when processing DATATYPE=EXTRACT or DATATYPE=ARCHIVE.

**FDR588 VOLSER SELECTION TABLE FULL – MAXONLINE VALUE IS nnnn – VOLSER vvvvvv BYPASSED**

**Reason:** The selection criteria specified by the user caused more than nnnn disk volumes to be tabled for processing. For example, DATATYPE=CATARCH or DATATYPE=CATVTOC attempted to table all volume serial number of each and every cataloged data set selected.

**Action:** Processing of this volume is bypassed. Volumes tabled prior to receiving this error message will be processed. For a more complete output, rerun the job specifying the MAXONLINE operand with a value for nnnn that is greater than the value printed.

**FDR589 VOLSER SELECTION TABLE FULL – MAXONLINE VALUE IS nnnn – REQUEST CANCELLED**

**Reason:** The selection criteria specified by the user caused more than nnnn disk volumes to be tabled for processing. For example, UNITNAME=SYSALLDA caused the volume serial number of each and every mounted disk volume to be tabled or more than nnnn disk volumes were specified by the VOL= operand.

**Action:** Processing is terminated prior to performing the specified request. Rerun the job, specifying the MAXONLINE operand with a value for nnnn that is equal to the number of online disk volumes in the installation.

**FDR596 STORAGE VALUE OF nnnnnnn INSUFFICIENT FOR MERGE – SUBCOMMAND TERMINATED**

**Reason:** The MERGE area, defined by the STORAGE operand of the MERGE subcommand, is not large enough to hold all the date ranges required to MERGE the ARCHIVE control files.

**Action:** Resubmit the job specifying a value for the STORAGE operand greater than the value printed. Unfortunately, estimates of the value required are hard to make. It is suggested the value be at least doubled.

**FDR598 ALLFILES/MAXFILES=/EXP= NOT ALLOWED WITH DISK OR NON-SL TAPE INPUT**

**Reason:** The COPY statement input to FDRTCOPY specifies either the ALLFILES, MAXFILES=, or EXP= operands, but the TAPEIN DD statement does not point to a tape, or is a unlabeled tape.

**Action:** Correct the COPY statement or the DD statement.

**FDR603 COPYING BACKUP OF DSN=dsname**

**Reason:** The PRINT=DSN option of FDRTCOPY was specified. This message documents each data set name or ICF component name found in the backup file being copied. The FDR615 message which follows shows the name of the backup file in which these data sets exist.

**FDR604 ERROR OCCURED POSITIONING TAPEIN REASON CODE-x**

**Reason:** FDRTCOPY detected an error when positioning the input tape during ALLFILES processing. The reason code x may be:

**REASON EXPLANATION**

1 – Tape mark not read when expected.

2 – Tape mark read when not expected.

3 – Trailer label read is not EOVS/EOF1.

4 – Header label read is not HDR1.

5 – Tape drive unit check during positioning.

6 – Other I/O error during positioning.

**Action:** A U0659 ABEND follows. This may be due to hardware problems with the tape drive. If it occurs with the same input tape on more than one tape drive, contact INNOVATION for technical support.

**FDR605 COPY TERMINATED AT TAPE MARK SEQUENCE**

**Reason:** During a multi-file COPY, FDRTCOPY found two consecutive tape marks following the trailer labels of the last file processed, indicating the end of the input tape(s).

**Action:** None. This is a normal completion.

**FDR606 COPY TERMINATED BY FILE COUNT**

**Reason:** During a multi-file COPY, FDRTCOPY completed copying the number of files specified by the MAXFILES operand.

**Action:** None. This is a normal completion.

**FDR607 COPY TERMINATED BY END OF VOLUME LABELS**

**Reason:** During a multi-file COPY, FDRTCOPY detected that the last file copied was followed by EOVS(End-Of-Volume) labels rather than EOF (End-Of-File) labels, so FDRTCOPY is not able to continue.

**Action:** None. This is not an error condition unless an FDR203 message is also printed to indicate that the last file copied was not a complete FDR backup.

**FDR608 MAXIMUM PAGEWIDTH(200) EXCEEDED BY nnn-REPORT CANCELLED**

**Reason:** The total length of the fields the user requested to be printed exceeds the maximum page width supported by FDREPORT.

**Action:** Try specifying the operand AUTOSTACK to force the stacking of eligible fields in an attempt to reduce the page width. If AUTOSTACK was specified, reduce the number of fields to be printed.

**FDR609 CURRENT PAGEWIDTH(nnn) EXCEEDED BY vvv-action**

**Reason:** User specified a PAGEWIDTH value of nnn to FDREPORT. The total of the fields requested to be printed exceeds this page width. If the output report DDNAME is not SYSPRINT, either by design or default, the output DCB is opened with a LRECL that corresponds to the pagewidth. The result is truncation of the print line and the action will be 'PRINT LINE TRUNCATED'. If the report DDNAME is SYSPRINT, 'PRINT LINE TRUNCATED' will appear only if the actual LRECL of 121 is exceeded.

**Action:** Increase the PAGEWIDTH, specify the AUTOSTACK operand to force eligible field stacking, or reduce the number of fields to be printed.

**FDR610 ICF CLUSTER TABLE FULL-ENTRY COUNT IS nnnnn-ICF SELECTION IS TERMINATED**

**Reason:** Selection of ICF VSAM data sets is being performed by base cluster name utilizing a look-aside table of clusters. The table has been filled, and selection of additional ICF VSAM data sets is no longer performed.

**Action:** An FDR670 message will have been issued previously. See the documentation for the FDR670 message and take the action indicated.

**FDR612 NO MEMBERS SELECTED-fffff REQUEST DENIED-DSN=dsname**

**Reason:** Member processing was requested by the processing program performing function fffffff, but no members in the partitioned data set named matched the selection criteria.

**Action:** Correct the error and re-execute.

- FDR615    dddddddd DSN=dsname FILE=fn VOL=vvvvvv... CATLG | DROP**
- Reason:**        Printed by FDRTCOPY at the end of each file copied. One FDR615 message will be printed for TAPEIN, TAPEOUT, and TAPE2OUT (if present). It documents the input or output DDNAME, data set name, file number (0 if on disk), and up to 20 volume serials. The message will include DROP if an input file was not copied due to being expired, or CATLG if an output file was successfully cataloged.
- FDR616    FDRARCH ABNORMALLY TERMINATED. COMP CODE=Ssss Uuuuu**
- Reason:**        FDRTCOPY invoked FDRARCH to update the ARCHIVE control file with information about copied ARCHIVE backups, but FDRARCH abnormally terminated. The termination code is either system ABEND sss or user ABEND/return uuuu.
- Action:**        Examine FDRARCH messages on SYSPRINT to determine the cause. The Archive control file update may have been partially or totally bypassed. If possible, correct the problem and re-execute the FDRTCOPY job. If not, contact INNOVATION for technical assistance.  
U0012 indicates that FDRARCH terminated with return code 12 due to some error; look for preceding FDRARCH error messages.
- FDR618    PROCESSING VOLUME vvvvvv AS ICF=IGNORE | ICFSOURCE=LOCATE**
- Reason:**        An FDREPORT submodule tried to bring the used portion of the VVDS into storage to satisfy ICF/VSAM report requests, but was unable to read the VVDS. An FDR63x message documenting the cause will precede this message.
- Action:**        If ICF=IGNORE was printed, the VVDS is unusable and ICF VSAM components will be processed as if they were non-VSAM data sets. This may indicate a serious problem with this volume.If ICFSOURCE=LOCATE is printed, catalog LOCATEs will be used to get information on ICF VSAM components and clusters instead of reading the VVDS directly. If no other errors occur, FDREPORT will run successfully, but it will run longer.
- FDR619    MODULE c...c TOO LARGE TO PROCESS-SYSLIB=d...d**
- Reason:**        FDRZAPOP attempted to read the module c...c in the data set d... referenced by SYSLIB. The module was required to support all processing functions but, due to the size of the module (or previously read modules), not enough buffer storage was available to complete the read. Because of user expansion of the protect, allocation, and/or unmovable tables, the storage buffer used by FDRZAPOP to store tables has been exceeded.
- Action:**        Contact INNOVATION for assistance in expanding the storage buffer used by FDRZAPOP.
- FDR620    SELECT COMMAND MISSING OR INVALID**
- Reason:**        the SELECT ARCHIVE command was not found in the SYSIN input file. The SELECT ARCHIVE command is required for the execution of the FDRTSEL program.
- Action:**        Specify the SELECT ARCHIVE command and operands.
- FDR621    SELECT COMMAND ARCHIVE OPERAND IS MISSING OR MISPELLED**
- Reason:**        the SELECT command does not contain the ARCHIVE operand. The SELECT ARCHIVE command is required for the execution of the FDRTSEL program.
- Action:**        Specify the ARCHIVE operand in the SELECT command.
- FDR622    SELECT COMMAND COPY= OR IFONLYCOPY= KEYWORD IS MISSING OR MISPELLED**
- Reason:**        the SELECT command does not contain the COPY= or IFONLYCOPY= operands. The COPY= or IFONLYCOPY operands are required for the execution of the FDRTSEL program.
- Action:**        Specify the COPY= or IFONLYCOPY= operands in the SELECT command.
- FDR623    ABR=NO IS INVALID WHEN SELECT COMMAND IS PRESENT**
- Reason:**        FDRTSEL can only copy files that conform to the ABR naming standards.
- Action:**        Specify the ABR=YES operand or use FDRTCOPY instead of FDRTSEL.

- FDR624 INVALID KEYWORD VALUE POINTED BY ? (QUESTION MARK) ON THE ABOVE STATEMENT**  
**Reason:** FDRTSEL detected an invalid keyword value. The preceding FDR624 message contains a ? (question mark) under the invalid keyword value.  
**Action:** [See Section 10.15](#) for information on the supported keyword values.
- FDR625 NO ARCHIVE RECORDS SELECTED BASED ON THE SPECIFIED CRITERIA**  
**Reason:** The specified selection criteria does not match any ARCHIVE backup on disk.  
**Action:** This may be a normal result; if not, run the ARCHIVE REPORT PROGRAM documented in [Section 53.05](#) to inspect the records in the archive file.
- FDR626 COPYDSN=YES MUST BE SPECIFIED ON COPY COMMAND WHEN SELECT COMMAND IS PRESENT**  
**Reason:** FDRTSEL requires that COPYDSN=YES be specified in the FDRTSEL control statements.  
**Action:** Specify the COPYDSN=YES operand or use FDRTCOPY instead of FDRTSEL.
- FDR627 DSN=dsname UNCATALOGED | SCRATCHED**  
**Reason:** FDRTSEL uncataloged or scratched the disk ARCHIVE backup after it was copied by FDRTSEL and the ARCHIVE CONTROL FILE was updated.  
**Action:** None. This message is informative only.
- FDR628 DSN=dsname UNCATALOG FAILED**  
**Reason:** FDRTSEL received a non-zero return code for the request to uncatalog the disk archive backup. This message is accompanied by a FDR516 message containing the error return codes.  
**Action:** See message FDR516.
- FDR629 DSN=dsname SCRATCH FAILED**  
**FDR629 volser CODE=nnnn**  
**Reason:** FDRTSEL received a non-zero return code for the request to scratch the disk archive backup. This message is accompanied by an FDR516 message containing the error return codes, and by another FDR629 message containing the scratch return code for each of the volumes where the archive backup resides.  
**Action:** See message FDR516.
- FDR630 INSUFFICIENT STORAGE service description - AMOUNT REQUIRED nnnnnnnn BYTES**  
**Reason:** FDREPORT submodule requires additional storage to perform the service described but is unable to get enough storage.  
**Action:** Increase region size and resubmit the job.  
If Message FDR631 follows, FDREPORT will run successfully.
- FDR631 VTOC WILL BE READ ONE (1) TRACK AT A TIME**  
**Reason:** Because of insufficient storage, FDREPORT was unable to read the entire VTOC into storage, so it will be read one track at a time.  
**Action:** FDREPORT should complete successfully, but the elapsed time will be increased.
- FDR632 SYS1.VVDS.Vvvvvvv IN ERROR - CONTAINS EXTENT COUNT OF ZERO**
- FDR632 SYS1.VVDS.Vvvvvvv REQUIRED - NAME NOT FOUND IN VTOC**
- FDR633 SYS1.VVDS.Vvvvvvv IN ERROR - FORMAT 3 DSCB NOT FOUND IN VTOC**

- FDR634 SYS1.VVDS.Vvvvvvv IN ERROR – I/O ERROR READING VVDS**  
**Reason:** FDREPORT was trying to read the VVDS since the volume contains ICF VSAM clusters or SMS-managed data sets, but it failed for the reason indicated.  
**Action:** Message FDR618 will follow.
- FDR635 TRKCALC FAILED – R15=xxxxxxx – VOL=vvvvvv – DSN=dsname**  
**Reason:** The TRKCALC svc was issued for the data set name listed to determine the number of BLKSIZE records that will fit on the device. The svc failed with a non-zero return code in register 15.  
**Action:** The following fields will be set to zero (0) as a result of the failing TRKCALC:  
 %CAPUSED, BLKSTRK, BYTESFRE, BYTESUSE, CAPBYTES  
 If questions arise regarding the reason(s) for receiving the FDR635 message, please call INNOVATION Technical Support.
- FDR640 UNIT NAME uuuuuuuu reason**  
**Reason:** A request was made to report on volumes selected by logical unit name (UNIT=uuuuuuuu) but the attempt to select volumes failed for "reason".  
**Action:** The request is terminated.
- FDR641 STORAGE GROUP=storgroup reason**  
**Reason:** A request was made to report on volumes selected by SMS storage group name (STORGRP=storgroup) but the attempt to select volumes failed for "reason".  
**Action:** The request is terminated.
- FDR648 I/O ERROR location – VOL=vvvvvv – DSN=dsname**  
**Reason:** An I/O error occurred during EXCP processing to extract information from either a pds directory or a suspected IAM data set.  
**Action:** This message is normally the only documentation produced when these error conditions occur. Further documentation in the form of the standard Innovation mini-dump will be produced if ENABLE=DEBUG is specified on either the DEFAULT or PRINT commands. If the error persists, obtain all available documentation and call INNOVATION Technical Support.
- FDR670 INSUFFICIENT STORAGE FOR ICF CLUSTER PROCESSING – AMOUNT REQUIRED nnnnnnnn BYTES**  
**Reason:** A processing program or submodule attempted to GETMAIN nnnnnnnn bytes of additional storage to table the active clusters within the ARCHIVE Control File but the storage was not available.  
**Action:** Increase region size and resubmit the job. Always followed by message FDR610 indicating ICF cluster processing is terminated for the remainder of this command execution.
- FDR671 ddname REFERENCES AN EMPTY ARCHIVE CONTROL FILE – subcommand CANCELLED**  
**Reason:** The ARCHIVE Control File being processed contains no records (i.e.: it has only been formatted by FDRARCH and never used by FDRABR).  
**Action:** Verify that the proper data set name was used for the ARCHIVE Control File you wished to process and correct if required.
- FDR672 ARCHIVED ON yy.ddd - FROM volser - DROPPED - DSN=dsname**  
**Reason:** The entry for data set name dsname ARCHIVED from disk volumes serial number volser on Julian date yy.ddd was dropped from the ARCHIVE Control File. This message will always be followed by one (1) or more FDR673 messages detailing the reason the entry was dropped and other action taken on behalf of the named data set or component.

**FDR673 action or reason description**

**Reason:** The following are the action descriptions that can be displayed:

1. COMPONENT OF DROPPED CLUSTER – CLUSTER=cluster name
2. COMPONENT HAS NO RELATED CLUSTER
3. ENTRY IS A DUPLICATE DATA SET NAME – MAXOCCURANCES=nnnnn
4. ENTRY IS AN EXCESSIVE GENERATION – MAXGENERATIONS=nnnnn
5. ENTRY MARKED AS HAVING BEEN RESTORED – RESTORE=PURGE SPECIFIED
6. ENTRY MARKED AS HAVING BEEN DELETED – DELETE=PURGE SPECIFIED
7. ALL ARCHIVE DUMP TAPES HAVE EXPIRED – EXPIRE=PURGE SPECIFIED
8. ENTRY NOT MARKED FOR AUTO RECALL – ENABLE=IFNOTAUTOREC SPECIFIED
9. ENTRY NOT CATALOGED FOR AUTO RECALL – ENABLE=IFNOTCAT SPECIFIED
10. DATA SET ON DISK – AUTO RECALL INDICATOR REMOVAL FAILED

NOTE: If this action description is present it is ALWAYS followed by an FDR516 message.

11. DATA SET ON DISK – AUTO RECALL INDICATOR REMOVED
12. UNCATALOGED FROM AUTO RECALL

**FDR674 RETURN CODE rrrr REASON IGG0CLcc-eeee**

**Reason:** A DELETE NOSCRATCH failed the data set name listed in the FDR511 or FDR514 message that immediately precedes this message. The return code and reason code are the same as documented for Message IDC3009I in the IBM System Messages Manual.

**FDR675 CONTROL FILE CONTAINS nnnnnnnn ACTIVE RECORDS**

**Reason:** List the current record count of the ARCHIVE Control File identified by Messages FDR505 and FDR507 when these messages are issued by the DUMP or REORG subcommands.

**FDR676 nnnnnn VOLUME(S) OF DEVICE=device type WILL BE RELEASED**

**Reason:** The reorganization of the ARCHIVE Control File has (will, if simulated reorganization) resulted in a nnnnnn number of tape volumes of the device type listed being made available for scratch use. They were required for the restore of ARCHIVED data sets that have been dropped (will be dropped, if simulated reorganization) from the ARCHIVE Control File.

**FDR677 CAUTION – BLOCK SIZE CHANGE RESULTING FROM THE RESTORE SUBCOMMAND****FDR677 CAUTION – PROCESSING PERFORMED BY THE MERGE SUBCOMMAND REQUIRES EXECUTION OF THE RECATALOG SUBCOMMAND WITH SERVICE=MERGE TO CORRECT THE AUTO RECALL CATALOG ENTRIES**

**Reason:** This is issued as a three (3) line continued message calling attention to the block size change in the ARCHIVE Control File that resulted from the RESTORE subcommand or the MERGE subcommand if RECAT=NO was specified.

**Action:** If this is to be the NEW PERMANENT ARCHIVE Control File, re-execute FDRARCH against this control file with the following subcommand:  
RECAT SERVICE=MERGE

If this is only a test control file or a control file used for SCRATCH=NO ARCHIVE runs this message may be ignored.

**FDR678 SORT=NO SPECIFIED – THE FOLLOWING OPERANDS WILL BE IGNORED**

**Reason:** SORT=NO was specified on the REORG subcommand of FDRARCH along with operands that are only valid if SORT=YES is specified. The list of the operands that will have no effect on this reorganization are listed on subsequent lines.

**Action:** If the operands that were ignored are required for your installation, re-execute FDRARCH changing SORT=NO to SORT=YES.

**FDR679 SORT=YES FORCED – CAUSED BY THE FOLLOWING OPERANDS**

**Reason:** The SORT= operand was not specified on the REORG subcommand of FDRARCH, although one or more operands were specified that are only valid if SORT=YES is specified. It is assumed that SORT=YES was IMPLIED by specifying the operands that are listed on subsequent lines.

- FDR690**    **pgmname ERROR CODE=nnnnnnnn**  
**Reason:**     FDRTSEL received a non-zero code upon return from the program whose name appears in the message.  
**Action:**     Examine the accompanying error messages generated by the failing program, contact INNOVATION if assistance is required.
- FDR691**    **MOVE COMMAND CANNOT BE SPECIFIED WITHOUT SELECT COMMAND**  
**Reason:**     FDRTSEL requires that a select command be present in order to select the disk archive backups to be moved.  
**Action:**     Specify the SELECT ARCHIVE command and operands.
- FDR692**    **ARCHIVE BACKUP SELECTED DSN=dsname VOL=volser CATLG BACKUP SELECTED DSN=dsname VOL=volser**  
**Reason:**     The archive backup data set name shown in the message was selected for processing.  
**Action:**     None. This message is informative only.
- FDR693**    **ARCHIVE FILE RECORD UPDATED -- VOL=volser ADATE=yy.ddd DSN=dsname**  
**Reason:**     This message indicates that the archive file record containing the archive backup (that was copied or moved) was updated to reflect the new archive backup volumes. This message is output for all data sets contained in the archive backup.  
**Action:**     None. This message is informative only.
- FDR694**    **- ERROR TABLE OF SELECTED DATA SET BACKUPS EXCEEDED xxxK**  
**Reason:**     This message indicates that the internal control table built by the SELECT CATLG processor exceeded its limit size. No files were copied.  
**Action:**     Modify SELECT CATLG criterion with VOL=, MAXGEN=, or MAXCYC= to reduce the number files being selected to copy. Contact INNOVATION Technical Support for further assistance.
- FDR696**    **DYNAMIC ALLOCATION ERROR COMP=cc, CODE=nnnn, INFO=iiii, DDNAME=**  
**Reason:**     This message indicates FDRTSEL encounter some form of dynamic allocation error.  
  
**CODE:**  
**6708** – With SELECT ARCHIVE, this indicates the ARCHIVE backup data set selected was not found on the volume indicated in the ARCHIVE Control File. Typically this indicates the data set has been previously scratched. No COPY or MOVE function is performed, and processing continues.  
**Action:**     For CODE=6708 the message can be ignored, or modify the SELECT ARCHIVE criteria to avoid selecting invalid files. See message FDR336 for further information.

**80.03 MESSAGES FROM SAR****FDR901 PROGRAM INTERRUPT – JOB TERMINATED**

**Reason:** SAR detected a program check ABEND during its operation. A core dump will be printed if the hardcopy device was specified. The program check PSW is saved by SAR at location X'180'.

**Action:** Contact INNOVATION for assistance with a core dump. If SAR did not print a dump, use the IBM Stand-Alone Core Dump Program.

**FDR902 SVC INTERRUPT – JOB TERMINATED**

**Reason:** SAR detected an SVC interruption during its operation. A core dump will be printed if the hardcopy device was specified. The SVC OLD PSW is saved by SAR at location X'180'.

**Action:** Contact INNOVATION for assistance with a core dump. If SAR did not print a dump, use the IBM Stand-Alone Core Dump Program.

**FDR903 I/O ERROR – JOB TERMINATED**

**Reason:** An unrecoverable I/O error occurred on one of the hardware devices. A FDR950-FDR990 message is printed detailing the error. A core dump will be printed if the hardcopy device was specified.

**Action:** Contact INNOVATION for assistance.

**FDR905 TAPE DEBLOCKING ERROR – DEPRESS INTERRUPT OR RESTART**

**Reason:** SAR deblocking routines detected an error in the tape block that was read. The tape block is at location X'6000' or X'20000' in the dump printed on the hardcopy device.

**Action:** Contact INNOVATION for assistance with a core dump. If SAR did not print a dump, use the IBM Stand-Alone Core Dump Program. Depressing INTERRUPT will allow SAR to continue with the next block. Pressing RESTART will take a core dump before continuing, if hardcopy is available.

**FDR906 NOT AN FDR TAPE – DEPRESS INTERRUPT OR RESTART KEY**

**Reason:** The tape presented to SAR did not contain the FDR header.

**Action:**

1. If the tape is really an FDR tape which has been clobbered, depressing the INTERRUPT key will allow SAR to continue processing from this tape. Location X'6000' in memory contains the bad header. Under VM, the VM command EXTERNAL simulates the console INTERRUPT key. Depressing RESTART will cause SAR to take a core dump before continuing.
2. Check that you have mounted the backup tapes in the proper sequence. If the tapes were not mounted in the proper sequence, you must reload SAR. Do not depress INTERRUPT.

**FDR907 TAPE BACKUP IS INCOMPATIBLE WITH DISK DEVICE TYPE – JOB TERMINATED**

**Reason:** The backup tape was from a different device type than the restore device type (ex: SAR cannot restore a 3350 to a 3380 Model E). A core dump will be printed if the hardcopy device was specified.

**Action:** Location X'6000' in the core dump printed on the hardcopy device contains the FDR header.

**FDR908 INVALID RESPONSE TO MESSAGE – RE-ENTER WITH A VALID ADDRESS**

**Reason:** The response to the last message received was invalid. On a CRT device the cursor is repositioned. If response was for a device type, check for a supported device. If the response was for the unit field, check for valid hex characters (0-9,A-F). If WITH A VALID ADDRESS appears, check that the unit address is available. Under XA, this address must be specified in the IOCP.

**Action:** Re-enter response to the message.

**FDR909 DISK VOLUME LABEL 'vvvvvv' DOES NOT MATCH OPERATOR LABEL – RE-ENTER**

**Reason:** The volume serial number supplied by the user does not match the volume label on the disk. vvvvvv is the volume serial found on the DISK unit specified.

**Action:** Re-enter the proper volume serial number. Check the DISK unit address to insure you are pointing to the correct unit.

**FDR911 TAPE RECORD LENGTH CHECK – DEPRESS INTERRUPT OR RESTART**

**Reason:** The length of the tape block read does not match the length coded by FDR in the tape block.

**Action:** Location X'6000' or X'20000' in the core dump contains the tape block. Contact INNOVATION for assistance. Depressing INTERRUPT will allow SAR to continue with the next block. Pressing RESTART will take a core dump before continuing, if a hardcopy is available.



**FDR913 WARNING BACKUP TAPE IS A DSF FORMAT TAPE – DEPRESS INTERRUPT OR RESTART**

**Reason:** The backup tape was produced by FDRDSF and may not contain a copy of the entire volume.  
**Action:** Depress the INTERRUPT key if SAR is to continue processing this tape. Under VM, the VM command EXTERNAL simulates the console INTERRUPT key. RESTART will cause SAR to take a core dump prior to continuing.

**FDR914 NONSTANDARD RECORD ZERO – X'ccccchhhrrkkllll'**

**Reason:** The record zero on the track indicated is of nonstandard size. The standard length is eight bytes.  
**Action:** If the record zero is shorter than 8 bytes, it will be dumped or restored as it appears on the disk. If it is longer, data in excess of 8 bytes will be lost.

**FDR916 LABEL ERROR ON TAPE REASON=x – JOB TERMINATED**

**Reason:** SAR encountered an I/O error or logical error reading the tape or disk labels. May be accompanied by a FDR950-FDR990 message. If JOB TERMINATED does not appear, SAR will ask for a new tape to be mounted.

**REASON CODE EXPLANATION**

- 1 – SAR did not find the HDR1 record on tape.
- 2 – The file number encountered on the tape was higher than the file number requested.
- 3 – Two tape marks were encountered trying to find the file number specified. The file is not on the tape.
- 4 – Then SAR was scanning the tape for the file number specified an end of volume (EOV1) record was encountered.  
The file is not on the tape.
- 5 – User specified a file sequence number other than zero or one and SAR found the tape to be non-labelled.
- 6 – On a backup operation, the user mounted a non-labelled tape for a second or subsequent volume, when the first volume was labelled. Mount a SL tape.
- 7 – An I/O error occurred reading the volume label on tape. Mount a new reel of tape.
- 8 – CLIP was specified. SAR could not read the label on disk or the volume record was missing or incorrect. SAR cannot re-label the volume.

**Action:** Supply the proper file number if a standard labelled file. If file number is not known or not readable, use the non-labelled option (Nnn) of SAR to bypass the label and point directly to the data.

**FDR920 ENTER DATA SET NAME – ENTER \*\*\*END TO PROCESS**

**Reason:** User specified the data set backup option. SAR is now requesting the data set names or groups to be dumped. SAR will display message DATA SET NAME=(on CRTs replacing the volume serial field). Enter the data set names after the equal sign. A data set name up to 44 characters may be entered. If a group name is to be specified, end the group name with an \*. SAR will dump all data sets found which match the characters specified before the \*.

EXAMPLE: DATA SET NAME=SYS1\* will dump all SYS1 data sets.

If the VTOC is to be dumped, enter \*\*\*VTOC. The will also dump cylinder zero head zero.  
 A maximum of ten (10) data set names or groups may be entered, one at a time.

**Action:** Enter the data set names to be dumped. Enter \*\*\*END to process the backup.

**FDR922 MOUNT NEXT REEL OF TAPE ON UNIT=uuu**

**Reason:** The SAR operation requires that another reel of tape be mounted.  
 On Restore – The backup file contains multiple reels of tape.

**Action:** On Dump – The dump of the disk requires more than one reel of tape. Mount a scratch tape.  
 Mount and ready the next reel. SAR will continue with the restore or backup operation, as soon as the tape becomes ready. If SAR does not recognize the READY, use the INTERRUPT key or RESTART key.  
 Under VM, the VM command EXTERNAL simulates the console interrupt key. The VM command SYSTEM RESTART simulates the RESTART key.

**FDR923 READY DEVICE nnnn UNIT=uuu**

**Reason:** The tape, disk or hardcopy should be made READY before responding to any of the option messages. If a device is not ready, this message will be issued.

**Action:** The device should be made READY. SAR will continue with the restore or backup operation, as soon as the tape becomes ready. If SAR does not recognize the READY, use the INTERRUPT key or RESTART key.  
 Under VM, the VM command EXTERNAL simulates the console interrupt key. The VM command SYSTEM RESTART simulates the RESTART key.

- FDR925 SAR DISK VOLUME RELABELED TO vvvvvv**  
**Reason:** User requested a clip operation. SAR has successfully relabeled the volume to the value specified.
- FDR926 ENTER NEW VOLUME SERIAL NUMBER**  
**Reason:** User has requested a CLIP or new label (CPY=C). SAR is requesting the new volume serial after validating the volume serial now on the disk.  
**Action:** Enter the new volume serial in the volume serial message.
- FDR927 ENTER ABSOLUTE TRACK ADDRESS IN DECIMAL – ENTER \*\*\*END TO PROCESS**  
**Reason:** User has requested an absolute track operation. Message STARTING CCHH= will be issued (on CRTs replacing volume serial).  
**Action:** Replace the cccchhhh with the cylinder and head number in decimal. After ENTER is depressed SAR will display the ENDING CCHH= message. The ending cylinder and head is then entered. Up to 10 absolute ranges may be specified. When the last range is entered, reply \*\*\*END to the STARTING CCHH= message.
- FDR928 MAXIMUM NUMBER OF ENTRIES EXCEEDED – ENTER \*\*\*END TO PROCESS**  
**Reason:** User has entered the maximum number of entries (10).  
**Action:** User must enter \*\*\*END for SAR to process the data sets or tracks specified.
- FDR929 RESTORED CYL=cccc TRK – 0....5....ABCDE0....5....ABCDEF**  
**Reason:** On absolute track operations, SAR will display any cylinder processed. An 'X' is printed for each track restored within the cylinder. The cylinder number is printed in hex.
- FDR930 TRACK TABLE ERROR**  
**Reason:** A cylinder and head address was encountered on the backup tape which exceeded the track capacity of the disk volume.  
**Action:** Contact INNOVATION for assistance.
- FDR931 VALID RESPONSE=ccc.....ccc**  
**Reason:** This is an informative message to indicate the responses which are valid for the current console message. SAR may not display all of the possible responses. [Section 30](#) of the FDR Manual details all of the allowed responses to a message.  
**Action:** Enter the appropriate response.
- FDR931 VALID RESPONSE=xxxxxx – IDENTIFIED BY SAR**  
**Reason:** The device type "xxxxxx" was determined by SAR as the actual type of the indicated disk device. It should not be overridden, except as discussed under "Alternate Device Support" in [Section 30.01](#).
- FDR932 I/O ERROR ON DISK TRACK X'ccccchhhh' – DEPRESS INTERRUPT OR RESTART**  
**Reason:** A logical or hardware error occurred on the disk track indicated. A FDR951-FDR990 error message may have been displayed detailing the error. The track address displayed is in hex.  
**Action:** SAR did not backup or restore the indicated track properly. If the user wishes for SAR to continue the operation on the next track, depress the INTERRUPT key. If RESTART is used, SAR will take a memory dump (if hardcopy is available) prior to continuing.
- FDR933 TAPE MOUNTED FOR HRDCOPY | DUMP | RESTORE IS VOL=vvvvvv | NOT LABELED  
SN=dsname**
- FDR933 REPLY YES FOR SAR TO USE IT AS SL | NL – NO TO REJECT – EXPDT=yyddd**  
**Reason:** SAR displays the volume serial, data set name (last 17 characters) and expiration date for each tape mounted. SAR cannot check the expiration date.  
If 'NOT LABELED' is displayed, SAR was unable to read a valid label on the tape.  
SAR also displays whether the backup will be written as NL or SL.  
On Restore – Only the first line of the message is displayed.  
**Action:** Reply 'YES' for SAR to use the tape for output. If the user replies 'NO', SAR will dismount the tape and request a new tape be mounted.

**FDR934 REPLY WITH NEW TAPE DATA SET NAME**

**Reason:** SAR is requesting the data set name to be used on a labeled output tape. SAR will display the name found on the tape (last 17 characters). This message will be issued for the first tape mounted.

**Action:** By depressing ENTER, SAR will default to writing this name on tape. User can override this name by specifying a new data set name. Up to 44 characters may be specified. If the NEWNAME is shorter than the original name, the remainder must be blanked out (the ERASE EOF key must not be used). SAR will use the last 17 characters specified.

**FDR935 ERROR READING THE VTOC ON DISK REASON=n JOB TERMINATED**

**Reason:** SAR encountered an error reading the VTOC on disk during a backup operation.

**REASON CODE****DESCRIPTION**

1 – I/O error occurred reading the disk volume label. This may be due to an uninitialized volume.

2 – A logical or hardware error was detected in the VTOC. A FDR950-FDR990 message may have been displayed detailing the error.

3 – First record in the VTOC is not a Format 4.

4 – More than one Format 4 record encountered in the VTOC.

5 – An empty VTOC track was found.

6 – The VTOC track did not deblock. The records found were not a multiple of 140 bytes.

7 – A dummy VTOC on cylinder zero head zero was encountered. This is a normal situation on VM CMS volumes.

**Action:** If JOB TERMINATED does not appear, SAR will continue the dump operation, dumping all of the tracks on the volume.

**FDR936 DISK NOT SUPPORTED FOR DUMP – JOB TERMINATED**

**Reason:** SAR cannot dump the volume specified. SAR uses the read multiple count-key-data command which is not supported on this control unit.

**Action:** Use FDR under an operating system to dump the volume.

**FDR937 COMPRESSION TECHNIQUE NOT SUPPORTED**

**Reason:** SAR detected that the tape to be restored was compressed in a format that this level of SAR does not support. The tape was created by a higher release of FDR than the release of SAR.

**Action:** This tape must be restored by a release of SAR that is compatible with the release of FDR that created the tape; or the tape can be restored by a high-enough release of FDR under an operating system, or the tape can be copied to uncompressed format with a high-enough release of FDRTCOPY under an operating system.

**FDR938 USE PSW RESTART OR ENTER ON CONSOLE TO RESTART**

**Reason:** SAR has terminated and can be restarted.

**FDR939 TAPE DSNAME MISMATCH DSN=dsname**

**Reason:** After mounting a volume of a multi-volume labeled restore tape, SAR found that the data set name in the header labels of the new tape does not match the data set name from the first input tape. The second line of msg FDR933 will also be issued. You may reply "YES" to accept the tape and restore it or "NO" to reject the tape and mount the correct volume.

**FDR940 ERROR READING LABEL ON DISK – ENTER 6 BLANKS TO BYPASS**

**Reason:** An I/O error occurred trying to read the disk volume (VOL1) label. If the text "- ENTER 6 BLANKS TO BYPASS" appears, you may blank out the volume serial to cause SAR to ignore the error and continue.

- FDR951 THRU FDR979**      **(I/O ERROR TYPE) uuu cc stat ssss seekaddr**
- Reason:** SAR issues these messages on I/O errors. This message contains the following information.  
 Type of error –in display format  
 uuu –unit address  
 cc –CCW command code  
 stat –CSW status – bytes 4 thru 7 of the CSW  
 ssss –sense information – first ten (10) bytes  
 seekaddr – seek address (DASD only)
- Action:** Most of the FDR951-FDR979 messages are self-explanatory. If not, contact INNOVATION for assistance. The text of each message is detailed below.
- FDR951 COMMAND REJECT**
- Reason:** 1. If a DASD device, check the output device type specified.  
 2. If the command is a X'5E', the control unit does not support the read multiple command. This disk cannot be dumped with SAR.
- FDR952 HRDCOPY DISABLED**
- Reason:** SAR detected an I/O error writing to the hardcopy device. SAR will continue processing with the hardcopy device disabled. CRT devices must not be used. Printers must have carriage control and buffers loaded prior to running SAR. Check that the proper hardcopy type was specified.
- Action:** Messages will only be sent to the console device. If hardcopy is necessary use another printer.
- FDR953 BUS OUT CHECK**
- FDR954 EQUIPMENT CHECK**
- FDR955 DATA CHECK**
- FDR956 OVERRUN**
- Reason:** This may indicate a timing problem between the channel and control unit. Possible cause is a mismatch between data streaming and non-data streaming.
- FDR957 ASSIGN ELSEWHERE**
- Reason:** A 3480 tape drive was specified which is not available to this system.
- Action:** Specify another tape drive or vary offline this drive on all other systems.
- FDR958 DATA CONV CHECK**
- FDR959 END OF CYLINDER**
- FDR960 SUBCHANNEL ERROR**
- FDR961 NOT AVAILABLE**
- Reason:** The channel or control unit address specified is not available or not operational from this CPU.
- Action:** If an alternate path exists, try that address (for non-XA, specify the explicit channel address in the first digit since SAR cannot know about the path otherwise). If you are running on a MP (multiprocessor system), it is possible that the device is only available from the other CPU; if possible, IPL SAR onthat CPU.
- FDR963 WRITE INHIBITED**
- Reason:** The READ/WRITE inhibit switch is set to READ only.
- FDR964 TRACK OVERRUN**
- Reason:** The original track information exceeds the track capacity of the restore device.
- FDR965 FILE PROTECTED**
- Reason:** No WRITE protect ring in tape or 3480 cartridge thumbwheel set to WRITE inhibit. SAR is attempting to write a backup or hardcopy file to this tape.

**FDR966 DASD END-OF-FILE**

**Reason:** If this error occurs when the volume label is being verified, the disk volume must not have a proper label. Use six blanks in the volume serial to bypass the label check. If the command is a X'5E', the control unit is at a very old level of micro code which terminates on END-OF-FILE records.

**FDR967 NO RECORD FOUND**

**Reason:** If this error occurs when the volume label is being verified, the disk volume must not have a proper label. Use six blanks in the volume serial to bypass the label check.

**FDR968 INVALID ERROR**

**Reason:** Error status occurred which SAR cannot interpret.

**FDR969 WRONG ERROR**

**Reason:** Error status occurred which should not occur.

**FDR970 CHAN CTRL ERROR****FDR971 INTERFACE ERROR****FDR972 CHAN DATA CHECK****FDR973 NOISE RECORD****FDR974 PROGRAM CHECK****FDR975 PROTECTION CHECK****FDR976 DATA-COMPACT ERR**

**Reason:** A 3480 cartridge containing data compacted by the 3480 IDRC feature was mounted for restore, but the 3480 tape drive was not capable of decompression.

**FDR977 INCORRECT LENGTH****FDR978 CHAINING CHECK****FDR979 SEEK CHECK ERROR**

**FDR990    INSTALLED INNOVATION TRIAL WILL EXPIRE ON yy.ddd**

**Reason:**     Product extension has completed successfully.  
Required JCL:

//EXTEND	EXEC	PGM=FDREXTND, PARM=xxxx
//STEPLI B	DD	DI SP=SHR, DSN=product. lib
//SYSLI B	DD	DI SP=SHR, DSN=product. lib
//SYSDI AG	DD	SYSOUT=*

PARM will be supplied by INNOVATION.

**FDR997    FDR ABNORMALLY TERMINATED VOL=vvvvvv**

**Reason:**     This FDR subtask has encountered an error from which it cannot continue. A user ABEND is being issued.  
**Action:**     A message detailing the error is printed.

**FDR998    cc...cc COMPLETED WITH ERRORS VOL=vvvvvv | [COMPAKT BYPASSED]**

**Reason:**     The program listed in the message completed with errors. A user ABEND or a condition code of 8 or higher will be issued at the completion of the task. If COMPAKT BYPASSED is printed, FDR was requested to COMPAKT the volume after a successful backup; this will be BYPASSED since FDR detected one or more errors.

**Action:**     Previous message(s) describe the error; see those messages for further details.

**FDR999    cc...cc SUCCESSFULLY COMPLETED VOL=vvvvvv**

**Reason:**     The program listed in the message completed without errors.  
**Action:**     None.

## 80.04 COMPAKTOR MESSAGES

- CPK301I INNOVATION DATA PROCESSING – COMPAKTOR VER. 5.2zaab DATE yy.ddd TIME hh.mm.ss PAGE nnn**  
**Reason:** This is the CPK page heading, specifying the version level of CPK. "z" will be "/" for the base release, and will be a letter (e.g., "A") for subsequent releases. "aa" is a 2-digit number indicating the level of integrated maintenance. "b" will be "P" for a production version, "T" for a trial, and "B" for a beta test version.
- CPK304I PARM – \*parm-field data\***  
**Reason:** Display input PARM field information.
- CPK305I CARD – \*control statement image\***  
**Reason:** Display all input control statements.
- CPK306I \*\*\*END OF CONTROL STATEMENTS\*\*\***  
**Reason:** Indicate end of input control statements.
- CPK307I \*\*\*NO CONTROL STATEMENTS WERE FOUND\*\*\***  
**Reason:** The SYSIN data set missing or empty. If COMPAKTOR is invoked by FDR or FDRABR, the CPIN/CPIN(xxxx) data set is empty.
- CPK316I COMPAKTOR RESTORED nnnnn TRACKS**  
**Reason:** nnnnn is the actual number of tracks that COMPAKTOR wrote to the output volume. On a COMPAKT-in-place (DUMP=YES) this may be considerably less than the allocated tracks on the volume, since data sets which have not moved will not be restored.
- CPK317I VTOC WILL NOT BE COMPAKTED. VSAM DATA SETS EXIST ON VOLUME**  
**Reason:** VTOC=COMPAKT was specified, but one or more non-ICF VSAM data spaces with non-zero secondary allocations quantities were found on the source volume. The VTOC will not be COMPAKTED. This message may sometimes appear even if VTOC=COMPAKT was not specified; in that case it should be ignored.  
**Action:** None.
- CPK318I %FOLD PERFORMANCE OPTION - FOLD LINE RELATIVE TRACK=nnnnn**  
**Reason:** The %FOLD=nn option was specified. nnnnn is the relative track number that COMPAKTOR calculated was the fold line (nn% of the allocated tracks lie below that point).
- CPK319I SIZEKEEP PERFORMANCE OPTION - nnnnn TRKS KEPT FOR DSN AT RELATIVE STARTING TRK tttt**  
**CPK319I SIZEKEEP PERFORMANCE OPTION - nnnnn TRKS KEPT TOTAL**  
**Reason:** The SIZEKEEP= option was specified (or the default values from the FDR/ABR Global Option Table were used). The first form of the message is issued for each data set which was made unmovable by SIZEKEEP processing; you can identify the data set by looking up relative track "tttt" in the BEFORE or AFTER map. The second form of the message shows the total tracks which were made unmovable by SIZEKEEP. If SIZEKEEP is in effect but no CPK319I messages are printed, then SIZEKEEP was unable to meet the objective for the percent reduction in the free space areas without making all data sets movable.
- CPK320I COMPAKTOR OPTIONS IN EFFECT –**  
**Reason:** Issued to inform you of run options in effect.
- CPK321I COMPAKTOR RELEASE | RESTORE STARTED**  
**Reason:** Issued just prior to start of physical disk pack RESTORE or space RELEASE. If this message is not issued, the disk pack was not altered in any way. After the message has been issued, the disk pack being processed is unusable until message CPK322I is issued.
- CPK322I COMPAKTOR RELEASE | RESTORE ENDED. [SOME BACKUP VOLUMES WERE NOT REQUIRED]**  
**Reason:** Indicates that COMPAKTOR has completed the RELEASE or RESTORE operation, and the volume should be usable. Some cleanup operations (such as mapping the COMPAKTED volume and rebuilding the VTOC Index) still remain to be done, so errors may still occur. On a RESTORE, if the text SOME BACKUP VOLUMES WERE NOT REQUIRED appears, this is simply an assurance that you need not be concerned if COMPAKTOR did not call for all the volumes of the FDR backup; tracks at the end of the volume did not need to be rewritten, probably because of %FOLD=nn or SIZEKEEP=.

- CPK403E EXCESSIVE NUMBER OF DATA SET AND/OR DSGROUP NAMES INPUTTED**  
**Reason:** Over 255 different names were found on SELECT control statements.  
**Action:** Rerun with fewer SELECT control statements.
- CPK404W kkkk=vvv IS INVALID. A DEFAULT VALUE MAY BE ASSUMED**  
**Reason:** The variable, vvv, is invalid for the keyword kkkk=  
**Action:** Check for valid data or numeric data for the keyword, as described in [Section 40](#). If COMPAKTOR ABENDED, fix the invalid variable and rerun, otherwise check that the assumed default value is acceptable.
- CPK405E THE FROMDD= PARAMETER IS INVALID, OR ITS DD CARD IS MISSING, OR IT DOES NOT SPECIFY A TAPE | DISK DEVICE, OR VOL= WAS SPECIFIED**  
**Reason:** You specified FROMDD= but the DDNAME you coded is invalid or incorrect, the DD statement is missing, the device type of the input device is not disk (required for TYPE=RLSE), or both FROMDD= and VOL= were specified.  
**Action:** Correct the error and rerun.
- CPK406E INVALID OR INCONSISTENT USE OF KEYWORD – kkkk=**  
**Reason:** The keyword, kkk, is not valid for the form of the DSNNAME command you used, or conflicts with a mutually exclusive keyword, which was also specified.  
**Action:** Correct the error and rerun.
- CPK407E LAST 'SEQ' COMMAND SPECIFIED A NULL SET, OR THE 'ENDSEQ' COMMAND IS NOT PRECEDED BY A 'SEQ' COMMAND**  
**Reason:** No SELECT control statements were found between a SEQ and an ENDSEQ command, or an ENDSEQ control statement is misplaced.  
**Action:** Correct error and rerun.
- CPK408E LAST READ CONTROL STATEMENT IS OUT-OF-SEQUENCE**  
**Reason:** A major command is preceded by one or more minor commands, or a SELECT DSG= command precedes a SELECT DSN/SEQ/ENDSEQ command.  
**Action:** Correct the error and rerun.
- CPK409E A REQUIRED OPERAND IS MISSING**  
**Reason:** An operand, either positional or keyword, required by the command is missing.  
**Action:** Correct the error and rerun.
- CPK410E EITHER 'ENDSEQ' COMMAND MISSING, OR POS=, DSG OR FILTER REQUESTED WITHIN A SEQUENCE SET. ASSUMING END OF SET**  
**Reason:** 1) An ENDSEQ command, delimiting a sequenced set, is missing.  
2) A SELECT command with a POS= or SCRATCH= operand was encountered within the range of a SEQ command. Remember, you cannot code the POS= operand for members of a sequenced set.  
3) A SELECT DSG command was encountered within the range of a SEQ command.  
**Action:** Correct the error and rerun.
- CPK411E THE FOLLOWING NAME WAS SPECIFIED MORE THAN ONCE – nnnnn**  
**Reason:** The given name, nnnnn, was found on two or more SELECT commands. You may specify a particular data set name or data set name group, only once within a control statements set.  
**Action:** Correct the error and rerun.
- CPK412W THE 'RLSE=' OPERAND WILL NOT BE HONORED WHEN 'POS=KEEP' IS ALSO SPECIFIED**  
**Reason:** Specifying POS=KEEP makes data sets unmovable. Thus, their unused tracks cannot be freed  
**Action:** None. This is only a warning message.
- CPK413E VTOC POSITIONING/SIZING IS INVALID WHEN 'VTOC=NOCHANGE' OR %FOLD IS ALSO SPECIFIED**  
**Reason:** A SELECT \*\*\*VTOC command was input, but VTOC=COMPAKT was not specified on the COMPAKT command.  
**Action:** Either remove the SELECT command or respecify the COMPAKT command.
- CPK425E UNABLE TO PROCESS VOL=vvvvvv – DUMMY VTOC OR CMS VOLUME**  
**Reason:** CPK found that the VTOC on this volume started and ended on cylinder zero head zero.  
**Action:** CPK will bypass this volume.



**CPK426E UNABLE TO OPEN DDNAME=ddddddddd – POSSIBLE MISSING DD CARD**

**Reason:** COMPAKTOR was unable to open for access the DD statement whose name is dddddddd. This usually occurs when the DD statement is missing.

**Action:** Supply the appropriate DD statement and rerun.

**CPK427E THE DEVICE TO RESTORE TO – UNIT=uuu, VOLSER=vvvvvv IS NOT SUPPORTED BY COMPAKTOR**

**Reason:** An unsupported disk device was referenced. See Introduction of this manual for a list of supported device types.

**Action:** If necessary, contact INNOVATION for technical assistance.

**CPK428E THE DEVICE DUMPED TO TAPE ON UNIT=uuu, VOLSER=vvvvvv, IS NOT SUPPORTED BY COMPAKTOR**

**Reason:** The internal device type code for the disk type on the backup tape is not among those supported. The backup tape may not be a valid FDR backup.

**Action:** Contact INNOVATION for technical assistance.

**CPK429E INPUT DEVICE ON UNIT=uuu, VOLSER=vvvvvv IS NOT SUPPORTED BY TYPE=FASTCPK | COMPAKTOR**

**Reason:** An unsupported disk device was referenced. See Introduction of this manual for a list of supported device types. If TYPE=FASTCPK is printed, FAST COMPACTion is not supported on disks prior to the 3380.

**Action:** If necessary, contact INNOVATION for technical assistance.

**CPK430E THE DEVICE TO RESTORE TO – *TTTTTT* IS INCOMPATIBLE WITH | SMALLER THAN THE INPUT DEVICE – ddddddd**

**Reason:** The above device types, rrrrrr and ddddddd, are incompatible devices. COMPAKTOR only allows you to restore to the same device type that you dumped from. The exceptions to this rule are noted in the Introduction of this manual. FDRDSF or ABR may be used to restore to unlike device types. If SMALLER THAN is in the text, then the target device is a lower density version of the same device type (E.G., 3380 and 3380-K), and the message is simply a warning; the COMPACTion will proceed but other errors may occur if the input data sets cannot successfully be placed on the smaller disk.

**Action:** Retry with a valid device as the target device.

**CPK431E ERROR TRYING TO DETERMINE DEVICE TYPE**

**Reason:** A DEVTYPE SVC issued to verify the device type received a non-zero return code.

**Action:** Contact INNOVATION for technical assistance.

**CPK432E 'SIZE=nnnnn' IS TOO LARGE**

**Reason:** The specified new VTOC size nnnnn is excessively large.

**Action:** Correct the error and rerun.

**CPK433E INVALID CCHH POSITION SPECIFIED – cccchhhh**

**Reason:** 1) The cylinder address, cccc, is invalid. It exceeds the device capacity.  
2) The track address, hhhh, is invalid. It exceeds the maximum number of tracks per cylinder.  
3) The given cccchhhh is all zeroes.

**Action:** Correct the invalid address and rerun.

**CPK451E INVALID CONTINUATION OF A QUOTED STRING**

**Reason:** A quoted string was improperly continued onto the following control statement. It does not start at column 16 of the continuation statement.

**Action:** Correct the error and rerun.

**CPK452E EXPECTED CONTINUATION CARD NOT RECEIVED**

**Reason:** Continuation was indicated on a control statement, but no further control statements followed.

**Action:** Correct the error and rerun.

**CPK453E CONTINUATION COLUMN IS NON-BLANK, BUT LAST PARAMETER DOES NOT END WITH A COMMA OR IN COLUMN 071**

**Reason:** See rules for continuing operand fields in the Introduction of this manual.

**Action:** Correct the error and rerun.

**CPK454E INTERNAL PROGRAM ERROR. CALL VENDOR FOR ASSISTANCE**

**Reason:** Program software error.

**Action:** Contact INNOVATION DATA PROCESSING for assistance.

- CPK455E UNBALANCED PARENTHESES. EXPECTING A PARENTHESES AT COLUMN nnn**  
**Reason:** A left (open) parenthesis does not have a matching right (close) parenthesis.  
**Action:** Correct the error and rerun.
- CPK456E INVALID USE OF DELIMITER AT COLUMN nnn**  
**Reason:** A delimiter character (blank, parenthesis, apostrophe, comma or equal sign) is used in violation of the COMPAKTOR command language syntax.  
**Action:** Correct the error and rerun.
- CPK457E LAST READ CARD CONTAINED NO DATA**  
**Reason:** A completely blank control statement was input.  
**Action:** Correct the error and rerun.
- CPK458E UNIDENTIFIED COMMAND AT COLUMN nnn**  
**Reason:** The command starting at column nnn is not a valid COMPAKTOR command.  
**Action:** Correct the error and rerun.
- CPK459E INVALID KEYWORD – kkkkkk**  
**Reason:** The keyword, kkkk, is not a valid keyword parameter for this command.  
**Action:** Correct the error and rerun.
- CPK460E EXCESSIVE NUMBER OF OCCURRENCES OF COMMAND – ccccccc**  
**Reason:** The command ccccccc has appeared more than its maximum number of occurrences. Check command description in [Section 40](#) of this manual for the maximum allowed occurrences.  
**Action:** Correct the error and rerun.
- CPK461E UNIDENTIFIED POSITIONAL PARAMETER AT COLUMN nnn**  
**Reason:** A positional parameter was detected starting at column nnn, but all positional parameters accepted by the command have already been input.  
**Action:** Correct the error and rerun.
- CPK462E UNBALANCED APOSTROPHES. EXPECTING AN APOSTROPHE AT COLUMN nnn**  
**Reason:** A quoted string does not begin and end with an apostrophe or an apostrophe is misplaced or a single apostrophe within a quoted string is not correctly represented by two consecutive apostrophes.  
**Action:** Correct the error and rerun.
- CPK463E DUPLICATE KEYWORD DETECTED – kkkkkkk**  
**Reason:** The keyword kkkkkkk appears more than once within the operand field of a particular command.  
**Action:** Correct the error and rerun.
- CPK464E EXCESSIVE PARAMETER DATA LENGTH FOUND AT COLUMN nnn**  
**Reason:** The variable data for a positional or keyword parameter exceeds its maximum allowed length.  
**Action:** Correct the error and rerun.
- CPK465E EXCESSIVE SUBPARAMETERS SPECIFIED STARTING AT COLUMN nnn**  
**Reason:** Too many positional subparameters, within parenthesis, were detected for a particular keyword or positional parameter.  
**Action:** Correct the error and rerun.
- CPK470W DUPLICATE VVR EXISTS FOR DSN=component**  
**CPK470W DATA SET IS UNCHANGEABLE DSN=component**  
**Reason:** COMPAKTOR is attempting to process ICF VSAM components on this volume. For the component indicated, either more than one VVR (VSAM Volume Record) exists for the component in the VVDS, or the characteristics of the cluster are such that COMPAKTOR cannot combine extents. In either case, the component is marked "unchangeable" (do not merge extents); however, the extents may be moved.
- CPK470W DATA SET IS ACTIVE OR UNMOVABLE DSN=dsname**  
**Reason:** The data set identified is either currently in use by another job or user, or is considered unmovable by COMPAKTOR. [See Section 40.15](#) for the reasons that COMPAKTOR considers data set to be unmovable. This message is produced only if the PRINT=ALL operand is specified.  
**Action:** The data set will not be moved. If DUMP=YES was specified, the data set will be dumped but will not be restored unless the TODD= operand is used to output to a different disk.

**CPK501E I/O ERROR ON UNIT=uuu, VOLSER=vvvvvv**

**Reason:** Issued when a permanent I/O error is detected on the direct-access device on unit uuu, with a volume serial number of vvvvvv.

**Action:** This message is always followed by a COMPAKTOR MINI DUMP. In this MINI DUMP you find the IOB, DCB, UCB, DEB, CCW CHAIN and the last home address read. Examine the IOB sense bytes to determine the reason for the I/O error. If you need assistance, please contact INNOVATION DATA PROCESSING.

**CPK502E I/O ERROR – synadaf information**

**Reason:** A permanent I/O error was detected reading the FDR backup.

**Action:** Examine the SYNADAF message to determine the cause of the error. Format of this message is documented in IBM SRL publications. For additional assistance, please contact INNOVATION.

**CPK503E UNEXPECTED END-OF-FILE ON INPUT TAPE**

**Reason:** FDR dump tape volumes were mounted in improper order or the FDR dump did not successfully complete.

**Action:** If message CPK321I has been printed and message CPK322I has not, the output disk volume is probably unusable. If the error can be corrected, or a good backup can be located, do an FDR restore or rerun the COMPAKTOR job (without DUMP=YES). Contact INNOVATION if you need assistance recovering from this error.

**CPK504E INPUT TAPE IS NOT AN FDR DUMP TAPE**

**Reason:** Either the input tape was not created by an FDR dump, or FDR encountered errors in the VTOC when dumping (Message FDR125).

**Action:** Insure tape is an FDR volume dump tape (DSF created tapes are not accepted by COMPAKTOR). Insure that tapes were mounted in the order they were created.

**CPK505E TAPE BLOCKSIZE ERROR. FIRST 64 BYTES OF BLOCK READ FOLLOW**

**Reason:** The number of bytes read does not match the internal blocksize or the block read is invalid. This may be due to tape drive hardware errors or tape media problems and can also be caused by copying an FDR dump tape with other than the FDR Tape Copy Utility FDRTCOPY (or FATAR).

**Action:** If possible, clean the tape and tape drive. Retry using a different tape drive or a different backup. If it still fails, contact INNOVATION for technical assistance.

**CPK506E AUTHORIZATION CHECK FAILED**

**Reason:** The volume being COMPAKTed is defined to RACF with DASDVOL class protection, and the userid for this job does not have ALTER authority.

**Action:** If the userid is supposed to be authorized, correct the volume profile or the userid.

**CPK507E INPUT TAPE HAS VTOC OR LABEL ERROR**

**Reason:** The input FDR backup does not contain a valid VTOC or a valid disk volume label.

**Action:** Use FDR to dump the volume again, and rerun COMPAKTOR.

**CPK512I FORMAT 4 INDICATES VOLUME OCCUPIES nnnnn CYLINDERS**

**Reason:** The Format 4 DSCB (the VTOC Descriptor record) indicates that the volume has nnnnn cylinders, which is different from what COMPAKTOR expects for this disk type. This disk may be a VM mini-disk or some non-IBM disk which contains a non-standard number of cylinders.

**Action:** COMPAKTOR will honor the value from the F4 DSCB if it is less than what COMPAKTOR expects.

**CPK513E INVALID REQUEST TO ELIMINATE UNUSED TRACKS FOR DATA SET- dsname. DATA SET IS EITHER UNMOVABLE, UNCHANGEABLE OR IS NOT A SEQUENTIAL OR PARTITIONED DATA SET**

**Reason:** A SELECT command specified the above named data set and requested that unused tracks or extents be freed. However, the data set is ineligible for this action.

**Action:** Correct control statement in error and rerun.

**CPK514W POSSIBLE FORMAT 5 ERRORS IN VTOC**

**Reason:** 1) Either no Format 5 DSCBs exist or they are incorrect.

2) The 'contamination' bit is on in the Format 4 DSCB, or the volume is a DOS volume.

**Action:** If COMPACTing, none required since COMPAKTOR will fix this problem. If mapping or simulating, either fix the VTOC yourself or COMPACT the volume and thus have COMPAKTOR fix it for you.

- CPK515E NON-STANDARD VTOC DETECTED. FORMAT 4 DSCB IS NOT THE FIRST RECORD OF FIRST VTOC TRACK**  
**Reason:** VTOC does not conform to IBM operating system standards. The first DSCB in the VTOC is not a Format 4 DSCB. COMPAKTOR cannot process this volume.  
**Action:** Volume may have to be initialized. Contact INNOVATION for assistance.
- CPK516E DSCB AT CCHHR(HEX) – cccchhhhr – IS PART OF A BROKEN F1-F2-F3 DSCB CHAIN**  
**Reason:** Either a Format 1 or Format 2 DSCB does not point to a Format 3 when it should; or a Format 2 or Format 3 DSCB has no F1/F2 DSCB pointing to it.  
**Action:** List the VTOC using the IBM IEHLIST utility, using the LISTVTOC command with the DUMP option. Locate the DSCB in error and attempt to fix the error condition. If the DSCB identified by CPK516E is a Format 3, you can superzap the DSCB to all binary zeros and then run a COMPAKTion to correct the VTOC. Sample JCL to do this SUPERZAP is in member F3CLEAR in the Installation Control Library.
- CPK517E DATA SET NOT FOUND, OWNS NO EXTENTS, OR IS UNMOVABLE – dsname**  
**Reason:** The named data set, specified on a SELECT DSNAME command, was not found, was a model DSCB, or was unmovable. [Section 40.15](#) lists the types of data sets that COMPAKTOR considers to be unmovable.  
**Action:** Correct the error and rerun.
- CPK518E DSCB AT CCHHR(HEX) – cccchhhhr – INVALID OR UNSUPPORTED DSCB TYPE**  
**Reason:** A DSCB was read and was not a Format 0, Format 1, Format 2, Format 3, Format 4 or Format 5 DSCB. Note that COMPAKTOR does not support Format 6 DSCBs, which describe split cylinder data sets, no longer supported on MVS.  
**Action:** If Format 6 DSCBs exist, you cannot COMPAKT, MAP or SIMULATE this volume.
- CPK519E DSCB AT CCHHR(HEX) – cccchhhhr – HAS AN INVALID EXTENT ADDRESS**  
**Reason:** One or more extent addresses in the specified DSCB are invalid. This may occur if COMPAKTOR cannot properly identify the type or density of the disk.  
**Action:** This is a serious error and should be attended to immediately. Follow procedures described in [Section 40.22](#) on VTOC ERRORS.
- CPK520W DSCB AT CCHHR(HEX) – cccchhhhr – HAS AN INVALID EXTENT SEQUENCE NO**  
**Reason:** Extents owned by a data set are numbered from 0 to 127, ascending. A violation of this rule was detected.  
**Action:** See message CPK519E.
- CPK521E DSCB AT CCHHR(HEX) – cccchhhhr – HAS INCORRECT EXTENT DESCRIPTOR FLAGS**  
**Reason:**
  - 1) A flag indicating that the extent is a user label extent (LABEL=SUL) was found on, but the extent is not the first owned extent.
  - 2) Flags indicate that the extent begins and ends on a cylinder boundary, when in fact it does not. This may lead to serious problems.
  - 3) Flags indicate extent is a shared (split) cylinder, not supported by MVS or COMPAKTOR.**Action:** List the VTOC using the IBM IEHLIST utility, using the LISTVTOC command with the DUMP option. Locate the DSCB in error and determine which problem it is. For problems 1) and 3), you must superzap the bad DSCB to fix the problem. For problem 2), COMPAKTOR will fix the problem.  
**NOTE:** This error often occurs on volumes reorganized using another COMPAKTOR-type program, which creates this error condition. We suggest you use COMPAKTOR instead.
- CPK522E DSCB AT CCHHR(HEX) – cccchhhhr – HAS AN INVALID CHAIN POINTER OR COUNT FIELD**  
**Reason:**
  - 1) The count field of the specified DSCB does not match its physical location.
  - 2) The chain pointer in a Format 1 or 2 DSCB is invalid.
  - 3) The chain pointer in a Format 3 DSCB is not zero.**Action:** Use FDRDSF PRINT ([Section 20.05](#)) to print the track on which the DSCB resides and determine which field is in error. If the count field is in error, you have a very serious problem and should contact your IBM representatives. If the chain pointer in a Format 1 or 2 DSCB is invalid, you can attempt to superzap the DSCB.
- CPK523E DSCB AT CCHHR(HEX) – cccchhhhr – HAS AN INVALID NUMBER OF EXTENTS**  
**Reason:** 1) The field in a Format 1 DSCB which specifies the number of owned extents is invalid; or it does not match the number of extents described in extent descriptors.  
**Action:** This is a serious problem. Determine the error type and attempt to fix the DSCB in error.

- CPK524E DSCB AT CCHHR(HEX) – cccchhhhr – DESCRIBES AN EXTENT WHICH OVERLAPS SOME OTHER EXTENT. OVERLAPPING EXTENT'S LOW AND HIGH CCHH(HEX) – cccchhhh-cccchhhh**
- CPK525E DSCB AT CCHHR(HEX) – cccchhhhr – IS THE OTHER DSCB INVOLVED IN OVERLAP. OVERLAPPED EXTENT'S LOW AND HIGH CCHH(HEX) – cccchhhh-cccchhhh**
- Reason:** COMPAKTOR has detected that two extent descriptor fields, in Format 1 or 3 DSCBs, claim ownership of the same track or tracks. This is a serious error. The data may be incorrect in both data sets.
- Action:** Determine the contents of the overlapped area and eliminate or fix one of the DSCBs involved. If one of the DSCBs is a Format 3 that has no F1/F2 pointing to it, then that is the one to be eliminated. Use SUPERZAP to zero out this DSCB (see message CPK516E).
- CPK526E DSCB AT CCHHR(HEX) – cccchhhhr – IS A SECOND FORMAT 4 DSCB**
- Reason:** Only one Format 4 DSCB is allowed in a valid VTOC. The identified DSCB is a second Format 4 DSCB.
- Action:** This is a serious problem. SUPERZAP may be used to zero the invalid DSCB. Sample JCL to do this SUPERZAP is in member F4CLEAR in the Installation Control Library ([Section 90.02](#)).
- CPK527I THIS DATA SET WILL NOT BE RESTORED – dsname**
- Reason:** Purely informative message. Used to provide a list of all data sets (such as temporary data sets) scratched by COMPAKTOR.
- CPK529I INDEXED VTOC EXISTS ON VOLUME=vvvvvv**
- Reason:** On SIM or MAP this is an informative message. On COMPAKT, indicates that CPK will convert the volume to OS format prior to COMPAKTion. At the end of a successful COMPAKTion, CPK will reconvert back to an indexed VTOC by executing ICKDSF.
- CPK530E CPKWORK MISSING INDEXED VTOC DISABLED**
- Reason:** CPK found that the volume contained an active indexed VTOC. The CPKWORK DD statement was missing. A COMPAKTion was indicated. CPK will convert the volume to OS VTOC format.
- Action:** User must include a CPKWORK DD statement if CPK is to convert the volume back to indexed format. The user can execute ICKDSF to convert back to an indexed VTOC.
- CPK531E IXSYSPRT DYNAMIC ALLOCATION FAILED INDEXED VTOC DISABLED**
- Reason:** COMPAKTOR attempted to allocate DDNAME IXSYSPRT to DUMMY so that ICKDSF could be invoked to rebuild the indexed VTOC. However, the dynamic allocation failed.
- Action:** The IXSYSPRT DD statement could be included in the COMPAKTOR execution JCL to avoid the problem. For this volume, the user need simply execute ICKDSF to rebuild the indexed VTOC since the COMPAKTion is completed.
- CPK532E ICKDSF ABNORMALLY TERMINATED WITH Cnnnn**
- Reason:** COMPAKTOR invoked ICKDSF to rebuild the indexed VTOC. However, ICKDSF abnormally terminated with return code cccc.
- Action:** If a DD statement for IXSYSPRT to SYSOUT was included, examine the ICKDSF messages. If not, look up the ICKDSF return code cccc in ICKDSF documentation. If the error can be ignored, execute ICKDSF to rebuild the indexed VTOC.
- CPK533I INDEXED VTOC SUCCESSFULLY REBUILT**
- Reason:** ICKDSF was successfully used to rebuild the indexed VTOC on the volume being COMPAKTed.
- CPK534E INTERNAL ERROR CONVERTING INDEXED VTOC**
- Reason:** An internal error in COMPAKTOR occurred when rebuilding the indexed VTOC.
- Action:** Contact INNOVATION for technical assistance.
- CPK535W CPK CANNOT REBUILD THE INDEXED VTOC – USER MUST REBUILD IT USING ICKDSF**
- Reason:** The volume serial of the COMPAKTed volume duplicates that of another online volume, and COMPAKTOR has placed it offline.
- Action:** Execute ICKDSF to rebuild the indexed VTOC on this volume when it can be mounted.
- CPK536I VOLUME=vvvvvv IS A SYSTEM MANAGED VOLUME– [IN INITIAL STATUS]**
- Reason:** The VTOC of the disk volume vvvvvv indicates that it is in System Managed Storage (SMS) format. If "IN INITIAL STATUS" appears, the volume is not yet completely converted to SMS.

**CPK537E    HOWEVER THE UCB DOES NOT INDICATE SMS**

**Reason:** This will appear after message CPK536I to indicate that the UCB of the input disk does not also indicate that it is SMS-managed. This may occur if the SMS volume is being accessed from a system which does not have SMS installed or active.

**Action:** None. COMPAKTOR will continue, unless message CPK538E is issued. However, if this system does have SMS active, it may indicate a serious problem with the SMS status of this volume.

**CPK538E    WARNING – OUTPUT VOLUME IS NOT SMS COMPATIBLE**

**Reason:** The System Managed Storage status indicated in the VTOC of the input volume (SMS-managed or not managed) does not match the SMS status indicated in the UCB of the output disk. If not SIMULATION, COMPAKTOR will bypass this volume.

**Action:** Ensure that the output disk has the same SMS status as the input disk volume or FDR backup. If you want to do the COMPAKTion in spite of this error (e.g., when moving or restoring SMS volumes on a non-SMS system), specify the operand SMSPROT=NONE on the COMPAKT statement.

**CPK540W    FORMAT 5 DSCB AT CCHHR(HEX) – cccchhhrrr – DEFINES AN INVALID FREE AREA IN EXTENT DESCRIPTOR nn**

**Reason:** The area described by the nn-th extent descriptor in the specified Format 5 DSCB is invalid, or describes some allocated tracks.

**Action:** If COMPAKTing, none. COMPAKTOR will create accurate Format 5 DSCBs. If MAP or SIMULATION run, either fix the error ([See VTOC ERRORS in Section 40.22](#)) or COMPAKT the volume.

**CPK541W    FORMAT 5 DSCBs LEAVE nnnnn TRACKS UNACCOUNTED FOR**

**Reason:** Some free tracks are not described by any Format 5 DSCB.

**Action:** See message CPK540W.

**CPK542E    UNABLE TO HONOR REQUEST TO ALTER VTOC POSITION OR SIZE. VSAM DATA SETS EXIST ON VOLUME**

**Reason:** A SELECT \*\*\*VTOC command was input but non-ICF VSAM clusters with non-zero secondary allocation quantities exist on volume to be COMPAKTed.

**Action:** Remove the SELECT command; or, if you need to alter the size or location of the VTOC on this volume, you must first EXPORT (not specifying TEMPORARY) all objects in VSAM data spaces with non-zero secondary allocation quantities, and DELETE the data spaces. After COMPAKTion, you can IMPORT the objects.

**CPK543W    INVALID REQUEST TO CHANGE VTOC POSITION OR SIZE. VSAM DATA SETS EXIST ON VOLUME. SIMULATION WILL CONTINUE**

**Reason:** A SELECT \*\*\*VTOC command was input but non-ICF VSAM clusters with non-zero secondary allocation quantities exist on source volume.

**Action:** COMPAKTOR continues the simulation and performs any requested VTOC position or size changes. However, this message is to warn you that your request to alter the VTOC's position or size will not be honored during a real COMPAKTion.

**CPK552E    THE FOLLOWING DATA SET IS INELIGIBLE FOR POSITIONING – dsname. IT IS EITHER UNMOVABLE, HAS A STANDARD-USER LABEL OR GIVEN CCHH POSITION IS INVALID FOR THIS DATA SET**

**Reason:** The positioning requested for the named data set is not possible because:

- 1) it is unmovable.
- 2) it has a user labels.
- 3) it must be on a cylinder boundary but the given position is not on such a boundary.
- 4) it was positioned so that, while its first track was within the volume, one or more tracks at the end of the data set were outside the volume track boundaries.

**Action:** Correct the error and rerun.

**CPK553E    ONE OR MORE ABSOLUTE POSITIONED DATA SETS OVERLAP A DATA SET AT CCCC.HH(decimal) – cccc.hh**

- Reason:**
- 1) A data set or a member of a sequenced set of data sets, would overlap an unmovable or previously positioned data set at the above address.
  - 2) If the cylinder/head address is beyond the end of the volume, then a data set or a sequenced set of data sets was positioned so that its end was outside the boundaries of the volume.

**Action:** Consult the extents map produced by COMPAKTOR and fix your control statements so as to avoid the error. Then rerun the job.

**CPK554E UNABLE TO COMPAKT THIS VOLUME [REASON=reason]**

**Reason:** All internal algorithms used by COMPAKTOR failed to complete. Usually occurs when you position data sets in such a way that COMPAKTOR is unable to allocate space for a large data set. A large number of unmovable data sets makes this message more likely.  
If REASON= is printed, FAST COMPAKTion was unable to process the volume for the reason printed. The volume has not been modified.

**Action:** Consult the extents map produced by COMPAKTOR and change the requested data set positioning, if possible.  
If REASON= is printed, correct the indicated problem, if possible, and resubmit the Fast COMPAKTion.

**CPK555E VTOC TOO SMALL TO HOLD ALL DSCBS. INCREASE VTOC SIZE AND RETRY**

**Reason:** You changed the size of the VTOC (SIZE= parameter), but it is now too small.

**Action:** Consult the summary map output by COMPAKTOR to determine the minimum VTOC size you require. Correct control statement in error and rerun.

**CPK556W COMPAKTOR UNABLE TO IMPROVE VOLUME BY RELEASE | COMPAKTING**

**Reason:** COMPAKTOR cannot improve the volume. Perhaps it was recently COMPAKTed. For TYPE=RLSE, no space could be released.

**Action:** COMPAKTOR will not produce the 'after' map. If COMPAKTING, the volume will not be COMPAKTed, but a SIMULATION will be done instead. If you wish to force COMPAKTOR to COMPAKT the volume specify any positioning command.

**CPK557E UNABLE TO ALLOCATE SEQUENCED SET CONTAINING DATA SET – dsname. THE SEQUENCED SET IS PROBABLY TOO LARGE**

**Reason:** After allocating all unmovable data sets and the VTOC, COMPAKTOR tried to allocate space for the sequenced set containing the named data set; it was unable to do this, because it could not find a single contiguous area large enough to hold the entire sequenced set.

**Action:** Have the sequenced set consist of fewer member data sets and rerun.

**CPK558I COMPAKTOR WILL NOW DO AN FDR RESTORE OF THE VOLUME**

**Reason:** COMPAKTOR was unable to COMPAKT the volume, but COMPAKTion was requested. Message CPK554E preceded this message.

**Action:** FDR is invoked to restore the volume.

**CPK559W mmmmmm BYPASSED DUE TO VOLUME BEING EXCLUDED | NOT EXCEEDING CONDITIONAL COMPAKTION OPTIONS**

**Reason:** One or more of the conditional COMPAKTion options CPKFREEEX, CPKDSNMX, CPKMULTX, or MINRLSE were specified, but none of the specified values were exceeded. mmmmmm is the type of run: SIMULATION, RELEASE or COMPAKTION or the volume was named in an EXCLUDE entry in the CPK unmovable table.

**Action:** COMPAKTOR will not produce the 'after' map.  
The volume will not be COMPAKTed.

**CPK560W CPK DID NOT FIND REQUESTED VOL=vvvvvv**

**Reason:** Dynamic allocation of online disk volumes was requested by the VOL= operand, but the requested volume serial vvvvvv was not found to be online.

**Action:** COMPAKTOR will proceed to the next requested volume, if any. If the volume serial was misspelled or inaccurate, correct it and reexecute COMPAKTOR.

**CPK561E DISK DYNAMIC ALLOCATION ERROR VOL=vvvvvv UCB=uuu COMP=comp CODE=code**

**Reason:** Dynamic allocation of online disk volumes was requested by the VOL= operand, but dynamic allocation of disk volume vvvvvv on device uuu failed. The dynamic allocation (SVC 99) completion code was "comp" and the return code was "code" (both values in hex).

**Action:** COMPAKTOR will proceed to the next requested volume, if any.

**CPK562I COMPAKTOR PROCESSING NEXT –**

**Reason:** Appears when COMPAKTOR dynamic allocation of online disk volumes was requested by the VOL= operand, and the second or subsequent volume is being processed. It identifies the type of COMPAKTOR run and the disk volume being processed.

**CPK563E VOL INVALID REASON = reason**

**Reason:** The VOL= operand was specified, but it is invalid for the reason indicated, which may include:  
**CANNOT BE SPECIFIED UNDER FDR/ABR**

**NOT SUPPORTED ON NON-MVS**

**ONLY ONE VOLUME CAN BE SPECIFIED ON CPK TYPE=COMPAKT**

**NO VOLUMES FOUND TO BE ONLINE**

**DISK1 DD STATEMENT SPECIFIED**

**Action:** If possible, correct the error and reexecute COMPAKTOR.



**CPK564I COMPAKTOR WILL RELEASE nnnnn TRACKS | LEAVING nnnnn TRACKS DSN=dsname | FROM VOL=vvvvvv**

**Reason:** For TYPE=RLSE only, indicates the total tracks which will be released from disk volume vvvvvv or the tracks released from the named data set.

**CPK580E END-OF-EXTENT APPENDAGE IS NOT THE FDR E-O-E APPENDAGE**

**Reason:** The FDR end-of-extent appendage, IGG019YZ, failed to execute properly or the appendage having that name is not the FDR end-of-extent appendage.

**Action:** Make sure that IGG019YZ is the FDR end-of-extent appendage. If you renamed IGG019YZ when you installed FDR, make sure you have updated the FDR Global Options Table ([Section 91](#)).

**CPK581E ANOMALOUS DATA ON TAPE WHOSE DD-NAME IS dddddddd**

**Reason:** This error may be caused by a number of internal consistency checks of the data read from a tape volume.

**Action:** Contact INNOVATION DATA PROCESSING for assistance.

**CPK582E TRACK tttt WAS NOT RESTORED**

**Reason:** I/O errors forced COMPAKTOR to skip certain DASD tracks and/or tape blocks during the restore. Usually preceded by one or more CPK501 and/or CPK502 messages.

**Action:** Track tttt is the track number relative to zero, of the track not restored. To determine which data set owns this track, you must locate the track in the BEFORE COMPAKTion map. Either recreate the data set, or retry the COMPAKTion using different DASD or tape devices.

**CPK583E ERROR UPDATING THE VVDS DATA SET CCHHR=cccc hhhh rr REASON=n**

**Reason:** COMPAKTOR had an error reading or updating the VVDS on the volume being COMPAKTeD. "cccc hhhh rr" is the cylinder/head/record of the VVDS block causing the error. "n" is a reason code:

- 1 – VVDS block is invalidly formatted
- 2 – VVDS block length is invalid
- 3 – I/O error reading the VVDS
- 4 – unable to acquire storage to save the VVDS
- A – VVR record type is invalid
- B – Type 23 cell is missing from VVR
- C – Extent number is zero in type 23 cell
- D – tracks/extent is not a multiple of CASIZE
- E – Bytes/extent is not a multiple of CAs/extent
- F – Extent exceeds volume size
- G – HI-ALLOC-RBA invalid
- H – Extent Count has increased
- J – Extent Count in Type 60 cell is invalid
- K – Extent Count in Q record invalid
- L – Duplicate Type Q record (imbedded index)

**Action:** Numeric reason codes will cause the whole VVDS block to be bypassed; some clusters may not be updated correctly. Alphabetic codes cause the VVR to be bypassed; only the cluster in that VVR will be affected. You should run an IDCAMS DIAGNOSE on the VVDS when any of these errors occur to identify errors in the VVDS.

**CPK584E ERROR UPDATING VVR COMP=ssss CODE=uuuu DSN=component name**

**Reason:** COMPAKTOR was updating the VVDS on another volume because a multi-volume cluster with a piece on this volume was changed, or COMPAKTOR was updating the VVDS on this volume during recovery processing and an error occurred. The CPL (Catalog Parameter List) that failed is printed following the message. For COMP values less than 4000, "ssss" is the return code and "uuuu" is the reason code as defined under message IDC3009I in the appropriate IBM Messages Manual.

COMP values over 4000 are generated by COMPAKTOR:

- 4089 – HI-ALLOC-RBA has gone negative
- 4090 – HI-ALLOC-RBA is not a multiple of CISIZE
- 4091 – HI-ALLOC-RBA was not returned
- 4092 – AMDSBCAT address was not returned
- 4093 – Type 23 cell track count went negative on the volume being COMPAKTeD
- 4094 – Type 23 cell extent count went negative on the volume being COMPAKTeD
- 4095 – Type 60 cell extent count went negative

**Action:** The VVR is bypassed; only the cluster in that VVR will be affected. This may indicate an error on one or more of the VVDSs involved, such as duplicate or orphan VVRs. You should run an IDCAMS DIAGNOSE on each VVDS.

**CPK585E UNABLE TO MOVE CCHH=x'cccchhhh' reason**

**Reason:** FAST COMPAKTion was unable to move track x'cccchhhh'.

**Action:** This is an internal error. Contact INNOVATION.



**CPK586W VOL=vvvvvv IS IN RECOVERY DUE TO A FAILED COMPAKTION AT hh.mm ON yy.ddd**

**Reason:** A Fast COMPAKTion (CPK TYPE=FASTCPK) was in progress on the indicated disk volume (starting at the indicated time and date) but that COMPAKTion did not complete for some reason, such as a system crash. This message is produced by any COMPAKTOR function against the failed volume, including MAP. The volume is not in a usable status; many data sets will not be usable.

**Action:** The Fast COMPAKTion must be restarted so that it can recover and make the volume usable again. If the CPK step getting the CPK586W message is a Fast COMPAKTion, COMPAKTOR will automatically do this recovery, after asking permission from the operator via a FDRW80 message (specify RECOVERY=YES on the CPK statement if you want to bypass the WTOR and immediately proceed with the recovery).

If this is a MAP or SIM, the step will proceed but will get a U0888 abend at the end. If it is a CPK TYPE=CPK (COMPAKT from backup), it will be terminated immediately. **In either case, you must submit a Fast COMPAKTion against this volume to make it usable.**

**CPK587W VOL=vvvvvv RECOVERY BYPASSED DUE TO OPERATOR OR CONTROL STATEMENT REQUEST**

**Reason:** A Fast COMPAKTion (CPK TYPE=FASTCPK) was in progress on the indicated disk volume (see message CPK586W) but that COMPAKTion did not complete for some reason, such as a system crash. This Fast COMPAKTion job attempted to recover from the failure but either the operator replied NO to the FDRW80 WTOR or RECOVERY=NO was specified on the CPK statement. Either of these indicate that recovery of the failed Fast COMPAKTion is not to be done.

**Action:** **The volume is not in a usable state. Many data sets may be unusable. You must submit another Fast COMPAKTion job and allow it to recover from the failure.**

**CPK595E FDR | FDRRESTR TERMINATED ABNORMALLY WITH COMP CODE Ssss Uuuuu**

**Reason:** FDR dump or CPK volume modification abnormally terminated with either a system ABEND code sss (in HEX), or a user ABEND code uuuu (in decimal).

**Action:** For SYSTEM ABENDS, refer to the appropriate SYSTEM CODES Manual. For user ABENDS, look it up in [Section 80.05](#). Also check for messages printed by FDR.FDRRESTR is the CPK module which actually modifies the output disk. If it is the abending module the volume may be corrupted.

**CPK600In COMPAKTOR SUCCESSFULLY COMPLETED | COMPLETED WITH ERRORS**

mmmmmm RUN – VOL=vvvvvv

**Reason:** Informs you of the status of the run. mmmmmm is the type of run: MAPPING, SIMULATION, RELEASE or COMPAKTION.

**CPK601I RESTORED DEVICE IS UNIT=uuu, VOLSER=vvvvvv, DEVTYPE=dddddd**

**Reason:** Identifies the COMPAKTed volume if an output disk was modified.

**CPK602A SERIOUS ERROR(S) DETECTED. COMPAKTOR ABENDING**

**Reason:** One or more previous error messages were issued and COMPAKTOR terminates abnormally.

**Action:** As required to fix error.

**CPK603A COMPAKTOR RESTORE CANCELLED BY CONSOLE OPERATOR | SYSTEM RESIDENT VOLUME**

**Reason:** The console operator cancelled COMPAKTOR run via a reply to a COMPAKTOR WTOR message, or COMPAKTOR detected that the output disk volume was the system residence (IPL volume).

**Action:** As required. The system residence volume cannot be COMPAKTed.

**CPK604A COMPAKTOR OPERATION TERMINATED BY CANCEL | REMAINING VOLUMES BYPASSED**

**Reason:** The operator attempted to cancel the COMPAKTOR job and it was intercepted by COMPAKTOR CANCEL protection. The operator then replied "S" to the FDRW99 message, causing COMPAKTOR to terminate after completing processing on the current volume. If more volumes were to be processed in the step, they are bypassed.

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## 80.05 ABEND CODES

FDR, DSF, FDRCOPY, CPK, ABR, or any of the FDR/ABR utilities may abend with any of the following user abend codes. In many cases, a diagnostic message is printed before the abend, so look up any error messages that were printed first. If no message was printed that relates to this abend, then read the explanation below. Call INNOVATION if you need assistance understanding or resolving the error.

The first column shows the code in decimal, as it appears in Operating System messages and most FDR messages, and the second column shows the code in hexadecimal as it may occasionally be printed.

Dec.	Hex.	
U0100	064	<b>Open Error Trying to Open a DASD or Tape DCB</b> Usually preceded by a FDR324 message. Check the job log for IBM messages which may indicate the reason for the error.
U0101	065	<b>Maximum I/O Errors Exceeded on a Direct-Access Device</b> More disk I/O errors than are allowed by the MAXERR= operand occurred. If you want to complete the operation in spite of the errors, specify a larger MAXERR= value. However, many data sets may be invalid.
U0102	66	<b>Alternate Tracks Invalidly Assigned</b> Alternate tracks are not assigned according to IBM specifications. Can only occur during a dump without BUFNO=MAX.
U0103	067	<b>Disk Device Type Not Supported</b>
U0104	068	<b>Full-Volume Restore to Unlike Disk Device Not Supported</b> Use FDRDSF, FDRCOPY or FDRABR to restore to an unlike device.
U0110	06E	<b>Invalid Extent Descriptor in DSCB or VVDS</b>
U0200	0C8	<b>Maximum I/O Errors Exceeded on a Tape Device</b> More tape I/O errors than are allowed by the MAXERR= operand occurred. If you want to complete the operation in spite of the errors, specify a larger MAXERR= value. However, many data sets may be invalid.
U0201	0C9	<b>Premature End-of-File Detected on Input Tape</b> The end of the backup file was encountered without reading FDR's trailer record. See Message FDR203.
U0202	0CA	<b>CPK Block Validity Check</b> COMPAKTOR issued Message CPK581E due to an invalid block length or other backup data consistency checks.
U0204	0CC	<b>FDR Block Validity Check</b> FDR issued Message FDR204 due to an invalid block length.
U0205	0CD	<b>Not an FDR Backup</b> A restore or COMPAKTion detected that the backup was not created by the FDR system, or an FDR full-volume restore detected that it was a data set backup. If the backup was created by FDRDSF with DSN=ALL, specify TAPE=DSF on the RESTORE statement.
U0207	0CF	<b>Maximum Tape Block Length Checks Exceeded</b> See Message FDR204.
U0210	0D2	<b>Internal error in Compress.</b>
U0300	12C	<b>Maximum for Count Field Errors on Direct-Access Device Exceeded</b> More FDR123 messages than are allowed by the MAXERR= operand occurred. If you want to complete the operation in spite of the errors, specify a larger MAXERR= value. However, many data sets may be invalid.
U0301	12D	<b>Maximum for Invalid Record Zeros on a Direct-Access Device Exceeded</b>
U0302	12E	<b>Internal End-of-Extent Error</b> The IGG019YZ module did not have the FDR identifier or was copied from a previous version of FDR or ABR. The most likely cause is that although you have installed a new version of FDR or ABR correctly in a Linklist library, there is an older version of IGG019YZ in LPALIB or in a library earlier in the Linklist concatenation. You must SCRATCH the older version.
U0303	12F	<b>ABR Full-Volume Restore Cancelled, no VTOC on the Backup</b>
U0304	130	<b>Internal Error on Full Volume ABR Restore on Model DSCB</b>
U0305	131	<b>Invalid ABR Restore Allocation List (FDRALLOC)</b>
U0401	191	<b>SYSIN DD Statement Error</b> SYSIN DD statement missing or incorrectly specified or I/O error on SYSIN data set.
U0402	192	<b>SYSPRINT/SYSPRIn/ABRMAP/SYSMAP DD Statement Error</b> One of the above DD statements is missing or incorrectly coded or I/O error occurred processing the data set. There must always be SYSPRINT DD statement, and there must be a SYSPRIn DD statement for each TAPEn DD statement when using ATTACH or ABR.

Dec.	Hex.	
U0405	195	<b>Invalid PARM field specified for FDR</b>
U0502	1F6	<b>One or more Control Statements are in Error</b>
U0503	1F7	<b>General Catalog Operation has Failed</b>
U0504	1F8	<b>Internal Sort Operations has Failed</b>
U0600	258	<b>Required DD Statement is Missing or in Error</b> A Message is always printed with the DDNAME and reason.
U0601	259	<b>Internal Error Reading a VTOC</b> An FDR MINI DUMP will be printed.
U0602	25A	<b>Error Restoring a Data Set or VTOC Error</b> An FDR message will detail the error.
U0603	25B	<b>Error on ABR Full Volume Restore</b> Message FDR328 was issued.
U0604	25C	<b>Tape Volume Count Error</b> More than twenty (20) tape volumes were used for the backup file from one disk volume (for backup or archive), or POOLDISK wrapped around the pool and wrote over the beginning of the data set.
U0605	25D	<b>VTOC Error Rewriting the ABR Model DSCB</b>
U0606	25E	<b>FORMAT=OLD Specified but Backup is Not in Old Format</b> The backup is in new or split format. Drop FORMAT=OLD from the RESTORE statement.
U0608	260	<b>FDRABR Tape Catalog Error</b> The disk volume currently being dumped has been restored or modified by a program other than ABR (i.e.: an old release of FDR or SAR). An attempt to correct the condition and resynchronize the disk volume and the catalog failed.
U0609	261	<b>Dynamic Allocation Error</b> Message FDR336 shows the specific cause.
U0610	262	<b>Internal Wait Error</b> This code can result from exceeding the maximum of nine unique units on TAPEX DD statements when running FDR or FDRDSF in ATTACH mode.
U0611	263	<b>Disk Device Type Not Supported</b>
U0612	264	<b>EXIT Error</b> A parameter passed back by a user security exit was invalid.
U0613	265	<b>Error Determining the Device Type</b> FDR issued a DEVTYPE SVC for a device and it failed.
U0615	267	<b>Last Tape Option Error</b> ABR detected an ABEND condition trying to read the validation file for the last tape option. The IBM ABEND is printed on the job log. Resubmit the job and ABR will ask for a scratch tape.
U0616	268	<b>VTOC Error</b> The number of DSCBs per track in the VTOC on a disk volume exceeded the maximum expected.
U0619	26B	<b>ARCHIVE DSCB Error</b> ABR attempted to ARCHIVE a data set that had invalid or overlapping extents.
U0620	26C	<b>Internal Error on the Remote Queue Data Sets</b>
U0621	26D	<b>Direct Access Device Type not Found in an Internal Table</b>
U0623	26F	<b>ARCHIVE DSCB Error</b> ABR attempted to ARCHIVE a data set that had an invalid FORMAT 2 or FORMAT 3 DSCB pointer.
U0624	270	<b>Internal DSCB Error on Format 2 or 3</b>
U0625	271	<b>TAPE or DISK DD Statement Error</b> An ABR TAPEX or DISKxxxx does not point to a supported device type.
U0626	272	<b>An FDR/DSF/ABR Tape Format is in Error</b>
U0628	274	<b>Maximum backup files requested on one restore.</b> See Message FDR338.
U0629	275	<b>Internal Logic Error</b>

## ABEND CODES

Dec.	Hex.	
U0632	278	<b>Internal CPK Unmovable Table is Full</b> The table built by FDR when running under CPK for unmovable data sets is full. The backup is terminated, and COMPAKTion is not attempted. The disk volume is not disturbed in any way. You can increase the size of the table (default: 8000) by specifying CPKUCORE=nnnnn on the DUMP TYPE=FDR command. However, a large number of unmovable data sets will impact COMPAKTOR's ability to COMPAKT the volume, so the COMPAKTion may not be worth continuing.
U0633	279	<b>Internal Logic Error in BUFNO=MAX</b>
U0634	27A	<b>More than one VVDS in the VTOC</b>
U0650	28A	<b>DISKxxxx DD Statement OPEN Failed</b>
U0654	28E	<b>VTOC Read Error</b>
U0655	28F	<b>VTOC Rewrite Error</b>
U0658	292	<b>Mixed Program Levels</b> See Message FDR496.
U0659	293	<b>Internal Logic Error</b>
U0701	2BD	<b>Error in CPK rebuild of indexed VTOC or update of VVDS</b>
U0777	309	<b>Internal program error, environment error or user error.</b> Some possible causes are: <ol style="list-style-type: none"> <li>1. A module was called by a module from a different version or level.</li> <li>2. A module received an invalid parameter list.</li> <li>3. A TSO-only module was executed in batch.</li> <li>4. An unexpected error was encountered in an Operating System routine.</li> </ol>
U0801	321	<b>Restore Cancelled by Operator or security failure</b> This ABEND can also be issued for other errors as described by messages in the listing.
U0802	322	<b>Invalid Completion Code from a User Exit</b> A parameter passed back by a user security exit was invalid.
U0887	377	<b>Dynamic Allocation Error.</b> An ABEND was forced by the DEBUG option.
U0888	378	<b>A Non-Terminating Error Occurred</b> One or more FDR, DSF, FDRCOPY, ABR or CPK operations abnormally terminated or ended with diagnostic messages, but the errors were not severe enough to prematurely terminate the entire step. This abend is issued to call attention to the errors. Examine the printout for the error messages causing this abend. If a subtask abnormally terminated, the real ABEND code is printed in the storage dump and in the FDR319 message. FDR, DSF, FDRCOPY, and CPK will issue this abend by default when non-terminating errors occur, but the abend can be changed to a return code by updating the FDR/ABR Global Option Table. ABR issues a return code of 12 in this case, by default, but it can be changed in the option table to issue the U0888 abend instead.
U0996	3E4	<b>Internal Debugging Abend</b> Contact INNOVATION if this abend occurs unexpectedly.
U0997	3E5	<b>Internal Debugging Abend</b> Contact INNOVATION if this abend occurs unexpectedly.

**80.06 WAIT STATE CODES FROM SAR**

SAR issues wait states indicating an action is required or an error has occurred. Most wait states are preceded by an explanatory message. The wait state code is the last four digits of the current PSW. On most CPUs the PSW is automatically displayed on the hardware console when the STOP key is pressed.

**WAIT STATE****00E2 MACHINE CHECK**

**Reason:** A machine-check (CPU error) has occurred and SAR is unable to continue.

**Action:** Display storage location 232 (X'E8') to get the machine check interrupt code, which can be interpreted using information in the PRINCIPLES OF OPERATION and/or REFERENCE SUMMARY for your CPU. Contact your hardware maintenance vendor for assistance.

**1111 I/O WAIT AND RETRY PSW**

**Reason:** A normal wait state during I/O operations.

**3333 CONSOLE ERROR**

**Reason:** An I/O error has occurred reading or writing from the master console. The console bell will also ring. This is not preceded by a message.

**Action:** Retry using a different console. Either press ENTER/RETURN on a different console device after re-IPLing SAR, modify SAR for a different default console device using FDRSARLR.

**9999 EOJ WAIT STATE**

**Reason:** Normal wait state indicating end of job. an FDR99x message should have been printed.

**EEEE TERMINATE WAIT STATE**

**Reason:** An I/O error or other error has abnormally terminated SAR. An FDR9xx message detailing the error should have been printed.

**FFFF OPERATOR CONSOLE WAIT STATE**

**Reason:** This wait state indicates that SAR has been successfully loaded. SAR is now waiting for an attention interrupt, which will identify the device that SAR is to use as the master console.

## 80.10 FDRREORG MESSAGES

- FDRR00 TOTAL VOLUMES PROCESSED=nnnn – DATA SETS=nnnnnn – FAILED=nnnnnn**  
**Reason:** Informational  
**Action:** None
- FDRR01 ALL PROCESSING INITIATED FOR VOLUME GROUP gggggg, VOLUMES PROCESSED=nnnn, VOLUMES EXCLUDED=nnnn, DUPLICATE VOLUMES BYPASSED=nnnn**  
**Reason:** Informational  
**Action:** None
- FDRR02 PROCESSING COMPLETED FOR VOLUME vvvvvv – CODE=cccc DATA SETS SELECTED REORGANIZED=nnnn – FAILED=nnnn**
- FDRR02 REORG PROCESSED nnnn DATA SETS nnnn REQUIRED COMPRESSION nnnn TOTAL TRACKS RECLAIMED**
- FDRR02 PROCESSING COMPLETED FOR DATA SET c...c – CODE=cccc**  
**Reason:** Informational  
**Action:** None
- FDRR03\*\* SUBTASK NN ABENDED PROCESSING VOLUME vvvvvv – CODE=cccc**
- FDRR03\*\* SUBTASK NN ABENDED – CODE=cccc**
- FDRR03\*\* SUBTASK NN ABENDED PROCESSING DATA SET c...c – CODE=cccc**  
**Reason:** A subtask has abended with the listed system or user abend code.  
**Action:** For a system abend, determine if the abend was caused by a user correctable problem such as insufficient memory and rerun the job. It may be necessary to execute a RECOVER command to complete any incomplete re-loads. For a user abend, please refer to [Section 80.05](#) for an explanation of the abends issued by FDRREORG. It may be necessary to contact INNOVATION for assistance.
- FDRR04\*\* ALL SUBTASKS HAVE ABENDED – PROCESSING TERMINATED**  
**Reason:** Self explanatory.  
**Action:** Refer to the FDRR03 messages that were issued for each subtask abend.
- FDRR05\*\* STOPTIME IS LESS THAN CURRENT TIME – PROCESSING TERMINATED**  
**Reason:** The STOPTIME parameter specifies a time that is less than the current.  
**Action:** Provide an acceptable STOPTIME and rerun the job.
- FDRR06\*\* STOPTIME PROVIDES LESS THAN 1 MINUTE OF RUNTIME – PROCESSING TERMINATED**  
**Reason:** The STOPTIME parameter must allow for at least one minute of runtime.  
**Action:** Provide an acceptable STOPTIME and rerun the job.
- FDRR07\*\* VALID SELECT STATEMENT NOT FOUND – PROCESSING TERMINATED**  
**Reason:** A REORG or SIMULATE command was specified without a required SELECT statement.  
**Action:** Provide at least one SELECT statement and rerun the job.
- FDRR08\*\* ALLDSN REQUIRED IF A DSN LIST IS NOT PROVIDED – PROCESSING TERMINATED**  
**Reason:** The SELECT statement did not contain either a CATDSN or DSN operand.  
**Action:** To process all data sets selected by the flagged SELECT statement, include ALLDSN to indicate that this is your true intention. Otherwise, add CATDSN or DSN.
- FDRR09\*\* VOLUME LIST NOT PROVIDED – PROCESSING TERMINATED**  
**Reason:** The VOL= operand is required unless CATDSN is used to select data sets.  
**Action:** Provide the VOL= operand or use CATDSN instead of DSN.
- FDRR10\* VOLUME vvvvvv DOES NOT HAVE A VTOC – VOLUME BYPASSED**  
**Reason:** Warning  
**Action:** If this is not a VM volume, the indicated volume is probably damaged and needs to be restored.

- FDRR11\*    RUNTIME/STOPTIME REACHED – NO NEW WORK WILL BE STARTED**  
**Reason:**     The limit specified by the user has been reached.  
**Action:**     FDRREORG will complete all active processing and process the next REORG or SIMULATE command.
- FDRR12\*    OPERATOR STOP COMMAND ISSUED – NO NEW WORK WILL BE STARTED**  
**Reason:**     Self explanatory  
**Action:**     FDRREORG will complete all active reorganizatons and terminate.
- FDRR13\*\*    VOLLIST BUILD ERROR – PROCESSING TERMINATED**  
**Reason:**     Internal error.  
**Action:**     Contact INNOVATION for assistance.
- FDRR14\*\*    VOLLIST SCAN ERROR – PROCESSING TERMINATED**  
**Reason:**     Internal error.  
**Action:**     Contact INNOVATION for assistance.
- FDRR15\*\*    ERROR BUILDING DSN MASKS – RC=ccc**  
**Reason:**     Internal error.  
**Action:**     Contact INNOVATION for assistance.
- FDRR16\*\*    UNIT NAME cccccccc NOT DEFINED TO SYSTEM**  
**Reason:**     The user provided unit name does not exist.  
**Action:**     Correct the unit name and rerun the job. If you have POOLDASD from Empact Software and are using undefined unit names to control pooling, change the POOLDASD option to YES in the FDRREORG option table.
- FDRR17\*\*    EDTINFO FAILED – RC=cccc, REASON=cccc**  
**Reason:**     Internal error.  
**Action:**     Contact INNOVATION for assistance.
- FDRR18\*\*    UCBLOOK FAILED – RC=cccc, REASON=cccc**  
**Reason:**     Internal error.  
**Action:**     Contact INNOVATION for assistance.
- FDRR19\*\*    UNIT NAME cccccccc CONTAINS INVALID DEVICE TYPES**  
**Reason:**     The unit name provided by the user contains devices that can not be used by FDRREORG.  
**Action:**     Provide a unit name that references TAPE or DASD devices and rerun the job.
- FDRR20\*\*    UNIT NAME cccccccc CONTAINS A MIXTURE OF DEVICE CLASSES**  
**Reason:**     The unit name provided by users contains a mixture of device classes, such as TAPE and DASD.  
**Action:**     Provide a unit name that refers to TAPE or DISK devices, but not both, and rerun the job.
- FDRR21\*\*    UNIT VERIFICATION INTERFACE ERROR – R15=cccc**  
**Reason:**     Internal error.  
**Action:**     Contact INNOVATION for assistance.
- FDRR22\*\*    UNABLE TO CREATE SMS MANAGED BACKUP DATA SETS – SMS NOT ACTIVE**  
**Reason:**     SMS is not active and the user included keywords that indicated that data sets which are dynamically allocated by FDRREORG are to be managed by SMS.  
**Action:**     Activate SMS or switch to unit name allocations.
- FDRR23\*\*    SMS SUBSYSTEM CALL ERROR – R15=cccccccc**  
**Reason:**     Internal error.  
**Action:**     Contact INNOVATION for assistance.



- FDRR24\*\* SMS INTERFACE ERROR – RETURN CODE=cccc, REASON CODE=cccc**  
**Reason:** Internal error.  
**Action:** Contact INNOVATION for assistance.
- FDRR25\*\* CLASS cccccccc NOT DEFINED TO SMS**  
**Reason:** The class name provided by the user has not been defined to SMS.  
**Action:** Provide a valid class name and rerun the job.
- FDRR26\*\* NOREORG LIST INVALID IN MODULE FDRNORG**  
**Reason:** The permanent exclude list which is defined by the NOREORG statements contained in the module FDRNORG is not in a valid format.  
**Action:** This module must be maintained by running FDRREOZO to add and delete the NOREORG statements.
- FDRR27\*\* INVALID HEADER IN MODULE FDRNORG**  
**Reason:** The permanent exclude list which is defined by the NOREORG statements contained in the module FDRNORG is not in a valid format.  
**Action:** This module must be maintained by running FDRREOZO to add and delete the NOREORG statements.
- FDRR28\*\* PARMLIST ERROR BUILDING NOREORG LIST**  
**Reason:** Internal error processing the NOREORG statements in module FDRNORG.  
**Action:** Contact INNOVATION for assistance.
- FDRR29\*\* INVALID NOREORG LIST KEYWORDS IN MODULE FDRNORG**  
**Reason:** The permanent exclude list which is defined by the NOREORG statements contained in the module FDRNORG is not in a valid format.  
**Action:** This module must be maintained by running FDRREOZO to add and delete the NOREORG statements.
- FDRR30 BACKUP | COMPRESS | RELOAD STARTED TARGET DSN=c...c BACKUP DSN=c...c**  
**Reason:** Indicates that the REORG function has started. This message will only be issued for PDS data sets if members are actually moved.  
**Action:** None
- FDRR31 BACKUP | COMPRESS | RELOAD ENDED TARGET DSN=c...c BACKUP DSN=c...c**  
**Reason:** Indicates the completion of the REORG function for a data set. For PDS data sets the message includes the number of tracks reclaimed and the tracks unused after compression. 0 tracks indicates a portion of a track was reclaimed. No tracks indicate that all of the members were in place.  
**Action:** None
- FDRR32 BACKUP | RELOAD PROCESSING TERMINATED**  
**Reason:** Processing has been terminated due to errors.  
**Action:** Refer to the preceeding error messages.
- FDRR33\*\* BACKUP | RELOAD FAILED – CODE=cccc,DSN=c...c**  
**Reason:** Backup or Reload processing has failed due to a system or user abend.  
**Action:** Take the action indicated for an MVS system abend. Refer to [Section 80.05](#) for user abends issued by FDRREORG.
- FDRR34\* NO DATA SETS FOUND IN CATALOG**  
**Reason:** The CATDSN keyword was specified and no data sets matching the user specified data set names or filters were found.  
**Action:** If there are additional SELECT statements they will be processed and the REORG or SIMULATE function will be performed provided the additional SELECT statements do not encounter the same error. If this is the only SELECT statement, processing will be terminated.
- FDRR35\*\* ERROR ATTACHING SUBTASK – RC=cccc**  
**Reason:** Internal error.  
**Action:** Contact INNOVATION for assistance.

- FDRR36 DATA SET QUALIFIES FOR REORGANIZATION – DSN=c...c**  
**Reason:** Informational  
**Action:** None
- FDRR37\*\* VSAM GET | PUT FAILED – R15=cccc, CODE=cccc, DSN=c...c**  
**Reason:** The indicated action failed.  
**Action:** Refer to the VSAM Macro Instruction Reference for a description of the record management return and reason codes.
- FDRR38\* UNABLE TO PERFORM LAST TAPE PROCESSING**  
**Reason:** Due to the error described by the preceeding message, LASTAPE processing is not possible.  
**Action:** Correct the error described by the preceeding and rerun the job.
- FDRR40\*\* VOLUME PROCESSING TERMINATED**  
**Reason:** Due to the error described by the preceeding message, volume processing is terminating.  
**Action:** Correct the error described by the preceeding and rerun the job.
- FDRR41\*\* ENVIRONMENTAL ERRORS LIMIT REACHED**  
**Reason:** The number of errors specified by the MAXENVERR keyword has been reached.  
**Action:** FDRREORG will complete all active work and terminate.
- FDRR42\*\* SYSTEM ABEND LIMIT REACHED**  
**Reason:** The number of errors specified by the MAXSYSERR keyword has been reached.  
**Action:** FDRREORG will complete all active work and terminate.
- FDRR43\*\* UNABLE TO ESTABLISH ESTAE – R15=cccc**  
**Reason:** FDRREORG was unable to establish its abnormal termination exit.  
**Action:** Contact INNOVATION for assistance.
- FDRR44\* ALL RETRY ATTEMPTS FAILED FOR DSN=c...c**  
**Reason:** A value other than NONE was specified for the DSNRETRY keyword and FDRREORG was unable to allocate the indicated data set before processing completed.  
**Action:** Rerun the job when the indicated data set(s) are not in use by another job.
- FDRR45 LASTAPE NOT REQUIRED – NEXT FILE FOR THIS TASK WILL HAVE FILESEQ=1**  
**Reason:** Last tape processing was requested but the next backup data set will be the first data set on a new tape volume. Since a new volume will be used for the next execution, a catalog entry is not created.  
**Action:** None
- FDRR46\*\* ERROR CATALOGING LASTAPE DATA SET – R15=cccc, DSN=c...c**  
**Reason:** A catalog error occurred when FDRREORG attempted to record the last tape information in the catalog.  
**Action:** Contact INNOVATION for assistance.
- FDRR47\*\* LOCATE ERROR – RETURN CODE cccc, REASON IGG0CLXX cccc, DSN=c...c**  
**SUPERLOCATE ERROR – RETURN CODE ccc – DSN=c...c**  
**Reason:** A catalog locate or superlocate error occurred for the indicated data set.  
**Action:** Refer to IBM message IDC3009I.
- FDRR48\*\* DATA SET BYPASSED**  
**Reason:** Due to the error indicated by the preceeding message, FDRREORG has bypassed the data set.  
**Action:** Correct the error described by the preceeding and rerun the job.

- FDRR49\*\* READ JFCB FAILED – DSN=c...c**  
**Reason:** A RDJFCB macro has failed.  
**Action:** Contact INNOVATION for assistance.
- FDRR50\*\* VTOC OPEN FAILED**  
**Reason:** An OPEN macro has failed for the VTOC.  
**Action:** Refer to IECnnn message in the job log.
- FDRR51\*\* VVDS OPEN FAILED – R15=cccc, CODE=cccc, DSN=c...c**  
**Reason:** An OPEN macro has failed for the VVDS.  
**Action:** Refer to the VSAM Macro Instruction Reference for a description of the VSAM open return and reason codes.
- FDRR52\*\* OPEN FAILED FOR TARGET DATA SET – R15=cccc, CODE=cccc, DSN=c...c**  
**Reason:** An OPEN macro has failed.  
**Action:** Refer to the VSAM Macro Instruction Reference for a description of the VSAM open return and reason codes.
- FDRR53\*\* OPEN FAILED FOR BACKUP DATA SET – DSN=c...c**  
**Reason:** An OPEN macro has failed.  
**Action:** Refer to IECnnn message in the job log.
- FDRR54\*\* CLOSE FAILED FOR TARGET DATA SET – R15=cccc, CODE=cccc, DSN=c...c**  
**Reason:** An OPEN macro has failed.  
**Action:** Refer to the VSAM Macro Instruction Reference for a description of the VSAM open return and reason codes.
- FDRR55\*\* I/O ERROR READING VTOC – ERROR CODE=xx, CSW=xxxx, SENSE=xxxx, CCCCHHHH=xxxxxxxx**  
**Reason:** An I/O occurred while reading the VTOC.  
**Action:** Correct the VTOC or contact Innovaton for assistance.
- FDRR56\*\* VVDS GET FAILED – R15=cccc, CODE=cccc**  
**Reason:** An error occurred while reading the VVDS.  
**Action:** Refer to the VSAM Macro Instruction Reference for a description of the record management return and reason codes.
- FDRR57\*\* VVDS READ FAILED – RC=cccc, RBA=xxxxxxxx, DSN=c...c**  
**Reason:** A read request to the VVDS manager has failed.  
**Action:** Refer to IBM message IDC3009I, return code 50.
- FDRR58\*\* VVDS UPDATE FAILED – RC=cccc, RBA=xxxxxxxx, DSN=c...c**  
**Reason:** A update request to the VVDS manager has failed  
**Action:** Refer to IBM message IDC3009I, return code 50.
- FDRR59\*\* UNABLE TO ALLOCATE VVDS ON VOLUME vvvvvv**  
**Reason:** Dynamic allocation of the VVDS has failed.  
**Action:** Refer to the dynamic allocation failure message which follows this message.
- FDRR60\*\* SYSDSN ENQ FAILURE – RC=cccc, DSN=c...c**  
**Reason:** An unexpected error occurred while attempting to enqueue the indicated data set for retry processing.  
**Action:** Contact INNOVATION for assistance.

- FDRR61\***    **DATA SET HAS MOVED FROM VOLUME vvvvvv TO VOLUME vvvvvv – DSN=c...c**  
**Reason:**    A VSAM data set on the retry queue is not on the volume it was on when it was selected.  
**Action:**    The data set is removed from the retry queue and bypassed.
- FDRR62\***    **DATA SET IS NO LONGER ON VOLUME vvvvvv – DSN=c...c**  
**Reason:**    An IAM data set or PDS on the retry queue is no longer on the indicated volume. The data set has either been moved or deleted.  
**Action:**    The data set is removed from the retry queue and bypassed.
- FDRR63\***    **RETRY DATA SET IS EMPTY – DSN=c...c**  
**Reason:**    A data set on the retry queue has become available but is now empty. The indicated data set has probably been deleted and redefined.  
**Action:**    The data set is removed from the retry queue and bypassed.
- FDRR64\***    **VOLUMES HAVE CHANGED FOR DSN=c...c**  
**Reason:**    An IAM data set or PDS on the retry queue has become available and the first volume of the data set has changed. The indicated data set has probably been deleted and redefined.  
**Action:**    The data set is removed from the retry queue and bypassed.
- FDRR65\***    **DATA SET NO LONGER QUALIFIES FOR RE-ORGANIZATION – DSN=c...c**  
**Reason:**    A data set on the retry queue has become available but no longer meets the selection criteria that caused it to be selected. The indicated data set has probably been reloaded or compressed by another job.  
**Action:**    The data set is removed from the retry queue and bypassed.
- FDRR66\***    **DATA SET REMOVED FROM RETRY QUEUE**  
**Reason:**    Issued after a FDRR61, FDRR62, FDRR63, FDRR64, or FDRR65 message.  
**Action:**    Refer to the appropriate message.
- FDRR67\*\***    **FDRREORG WILL RETRY REORG LATER – DSN=c...c**  
**Reason:**    A data set selected for reorganization is in use by another job and the SELECT statement that selected the data set specified a DSNRETRY option either RETRY, ENQ, or WAIT.  
**Action:**    The data set is added to the retry queue.
- FDRR68\***    **MAXENQ LIMIT REACHED – WILL ENQ LATER – DSN=c...c**  
**Reason:**    A data set selected for reorganization is in use by another job and the SELECT statement that selected the data set specified a DSNRETRY option either ENQ or WAIT. An ENQ was not issued because the maximum number of outstanding ENQ's as specified by the MAXENQ keyword have already been issued.  
**Action:**    The data set is added to the retry queue as if the RETRY option was specified. An ENQ will be issued when the count of outstanding ENQ's falls below the value specified by MAXENQ.
- FDRR69\*\***    **IAM 6.1 OR HIGHER IS EITHER INACTIVE OR NOT INSTALLED – PROCESSING OF IAM DATA SETS DISABLED**  
**Reason:**    The DSTYPE keyword specified IAM or ALL and a data set that appeared to be an IAM data set was encountered. An attempt to obtain information about the possible IAM data set using IAM's catalog interface indicated that IAM's catalog interface is not active.  
**Action:**    If IAM is installed, VIF must be active and it must be IAM 6.1 Level 08 or higher to reorganize IAM data sets. If IAM is not installed, do not use DSTYPE=ALL or DSTYPE=IAM.
- FDRR70\*\***    **DATA SET HAS MORE THAN 16 EXTENTS – DSN=c...cN**  
**Reason:**    The format 1 DSCB for a partitioned data set has an extent count that exceeds 16.  
**Action:**    The format 1 DSCB for the indicated data set is invalid and the data set will be bypassed.

- FDRR71\*\* FORMAT 3 DSCB POINTER MISSING – DSN=c...c**  
**Reason:** The format 1 DSCB for a partitioned data set indicated that the data set is in more than 3 extents which requires that a format 3 DSCB exist to describe the additional extents. The format 3 pointer in the format 1 DSCB however is zero.  
**Action:** The format 1 DSCB for the indicated data set is invalid and the data set will be bypassed.
- FDRR72\*\* ERROR READING FORMAT 3 DSCB – R15=cccc,DSN=c...c**  
**Reason:** An attempt was made to read the format 3 DSCB for the indicated partitioned data set and could not be found.  
**Action:** The format 1 DSCB for the indicated data set is invalid or the VTOC has been damaged. The data set will be bypassed.
- FDRR73\*\* FORMAT 3 DSCB NOT RETURNED BY OBTAIN – DSN=c...c**  
**Reason:** An attempt was made to read the format 3 DSCB for the indicated partitioned data set and the data return by OBTAIN was not a valid format 3.  
**Action:** Probable system error or VTOC damage. The data set will be bypassed.
- FDRR74\*\* MISSING EXTENT DESCRIPTOR(S) – DSN=c...c**  
**Reason:** A required extent descriptor for a partitioned data set in either a format 1 or format 3 DSCB was null.  
**Action:** Probable system error or VTOC damage. The data set will be bypassed.
- FDRR75\*\* EXTENTS OUT OF SEQUENCE – DSN=c...c**  
**Reason:** While validating a partitioned data sets extent descriptors in the format 1 or format 3 DSCB's, an extent sequence number was encountered that was not in the proper sequence.  
**Action:** Probable system error or VTOC damage. The data set will be bypassed.
- FDRR76\*\* INVALID FLAGS IN EXTENT DESCRIPTOR – DSN=c...c**  
**Reason:** While validating a partitioned data sets extent descriptors in the format 1 or format 3 DSCB's, an invalid extent descriptor flag was encountered.  
**Action:** Probable system error or VTOC damage. The data set will be bypassed.
- FDRR77\*\* INVALID CYLINDER/TRACK ADDRESS – DSN=c...c**  
**Reason:** While validating a partitioned data sets extent descriptors in the format 1 or format 3 DSCB's, a cylinder or track address was encountered that is not valid for the device.  
**Action:** Probable system error or VTOC damage. The data set will be bypassed.
- FDRR78\*\* FORMAT 1 DSCB MISSING FOR DSN=c...c**  
**Reason:** The format 1 DSCB for the indicated VSAM data component could not be found.  
**Action:** Probable system error or VTOC damage. The data set will be bypassed.
- FDRR79\*\* TRKCALC FAILURE – RETURN CODE=cccc,DSN=c...c**  
**Reason:** A TRKCALC macro failed.  
**Action:** Contact INNOVATION for assistance.
- FDRR80\*\* UNABLE TO FIND DATA | INDEX ASSOCIATION FOR DSN=c...c**  
**Reason:** The association list for a VSAM cluster did not contain an entry for the component type indicated in the message.  
**Action:** Probable catalog damage. Use an IDCAMS or TSO LISTCAT command to verify the catalog entry for the indicated cluster.
- FDRR81\*\* ERROR SETTING INTEGRITY ATTRIBUTES – R15=cccc, REASON IGG0CLxx ccccc, DSN=c...c**  
**Reason:** An attempt to ALTER the attributes for the indicated VSAM component failed.  
**Action:** Contact INNOVATION for assistance.
- FDRR82\*\* ERROR UNCATALOGING LASTAPE DSN – R15=cccc,DSN=c...c**  
**Reason:** CATALOG macro failed attempting to uncatalog a last tape data set name.  
**Action:** Contact INNOVATION for assistance.

- FDRR83\*\* ERROR CATALOGING BACKUP DATA SET – R15=cccc, BACKUP DSN=c...c**  
**Reason:** CATALOG macro failed attempting to catalog a tape backup data set.  
**Action:** Contact INNOVATION for assistance.
- FDRR84\*\* ERROR RESETTING UPDATE INHIBIT FLAG – R15=cccc, REASON IGG0CLxx cccc, DSN=c...c**  
**Reason:** Before starting reload processing, an attempt to turn off the update inhibit flag turned on during backup processing has failed.  
**Action:** Contact INNOVATION for assistance.
- FDRR85\*\* RE-USE OF DATA COMPONENT FAILED,DSN=c...c**  
**Reason:** Unable to dynamically reuse a VSAM data component due to the error described by the preceeding message.  
**Action:** Refer to the preceeding message and contact INNOVATION for assistance if necessary.
- FDRR86\*\* RE-USE OF INDEX COMPONENT FAILED,DSN=c...c**  
**Reason:** Unable to dynamically reuse a VSAM index component due to the error described by the preceeding message.  
**Action:** Refer to the preceeding message and contact INNOVATION for assistance if necessary.
- FDRR87\*\* ERROR UNCATALOGING BACKUP DATA SET – R15=cccc, BACKUP DSN=c...c**  
**Reason:** CATALOG macro failed attempting to uncatalog a tape backup data set.  
**Action:** Contact INNOVATION for assistance.
- FDRR88\*\* NON-GDGBASE CATALOG ENTRY EXISTS FOR DSN=c...c**  
**Reason:** BACKUP=GDG was specified and the name generated by FDRREORG for the base generation data group is already in the catalog and is not a base generation data group.  
**Action:** Remove the non gdg base entry from the catalog or use a different BACKUPGROUP or BACKUPINDEX.
- FDRR89\*\* UNABLE TO DEFINE GDG-BASE – R15=cccc, REASON IGG0CLxx cccc,DSN=c...c**  
**Reason:** BACKUP=GDG was specified and an attempt to define the base generation data group has failed.  
**Action:** Contact INNOVATION for assistance.
- FDRR90\*\* BACKUP DATA SET ALREADY CATALOGED – DSN=c...c**  
**Reason:** BACKUP=TEMP or BACKUP=PERM was specified and the backup data set name generated by FDRREORG is already cataloged.  
**Action:** Delete the catalog entry or use a different BACKUPGROUP or BACKUPINDEX.
- FDRR91\*\* CATALOG ENTRY TYPE FOR LAST TAPE DSN IS NOT NON-VSAM – DSN=c...c**  
**Reason:** LASTAPE was specified and the catalog entry found did not refer to a non-vsam data set.  
**Action:** After verifying that a data set name conflict does not exist between FDRREORG's last tape data set name and a valid data set on your system, delete the existing catalog entry. Contact INNOVATION for assistance if necessary.
- FDRR92\*\* ERROR RESTORING OWNERID AND ATTRIBUTES – R15=CCCC, REASON IGG0CLxx cccc DSN=c...c**  
**Reason:** A catalog error occurred while FDRREORG was attempting to restore the original ownerid and attributes of a VSAM data set.  
**Action:** Contact INNOVATION for assistance.
- FDRR93\*\* ERROR EXTRACTING DYNALLOC MESSAGES – R15=cccc**  
**Reason:** A dynamic allocation error has occurred and an attempt to use the dynamic allocation error message interface has failed.  
**Action:** Contact INNOVATION for assistance.
- FDRR94\*\* UNABLE TO ALLOCATE TARGET | BACKUP DATA SET-COMP=xx, CODE=xxxx,INFO=xxxx,DSN=c...c**  
**Reason:** A dynamic allocation error has occurred while attempting to allocate the indicated data set.  
**Action:** Refer to the IKJ message(s) that follows this message.

- FDRR96\*\* UNABLE TO ALLOCATE VOLUME – COMP=xx, CODE=xxxx, INFO=xxxx, VOL=vvvvvv**  
**Reason:** A dynamic allocation error has occurred while attempting to allocate the indicated volume.  
**Action:** Refer to the IKJ message(s) that follows this message.
- FDRR97\*\* DYNAMIC DEALLOCATION ERROR – COMP=xx, CODE=xxxx, INFO=xxxx, DDNAME=cccccccc**  
**Reason:** A dynamic allocation error has occurred while attempting to deallocate the indicated ddname.  
**Action:** Refer to the IKJ message(s) that follows this message.
- FDRR98\*\* ENQ FAILED FOR IAM DATA SET – DSN=c...c**  
**Reason:** FDRREORG was unable to obtain the IAMENQ for the indicated data set because it is in use by another job.  
**Action:** The data set is bypassed.
- FDRR99\*\* ERROR GENERATING DSNAME FOR BACKUP DATA SET**  
**Reason:** After applying the pattern as specified by the BACKUPINDEX keyword to the target data set name, an invalid data set name was detected.  
**Action:** The data set name generated was probably longer than 44 characters. Simplify the backupindex and rerun the job.

- FDRS01\*\* ERROR OBTAINING NAME(+1) FOR GDG – R15=cccc,DSN=c...c**  
**Reason:** BACKUP=GDG was specified and a catalog error occurred when FDRREORG attempted to get the name of the +1 generation.  
**Action:** Contact INNOVATION for assistance.
- FDRS02\*\* DATA SET NAME TOO LONG TO BE A GDG-BASE – DSN=c...c**  
**Reason:** BACKUP=GDG was specified and the name of the generation datagroup is longer than 35 characters.  
**Action:** Alter or use the BACKUPINDEX pattern to generate a shorter name.
- FDRS03\*\* RE-READ OF JFCB FAILED FOR BACKUP DATA SET**  
**Reason:** A RDJFCB macro has failed for the indicated backup data set after backup processing has completed.  
**Action:** The target data set is not reloaded. Contact INNOVATION for assistance.
- FDRS04\*\* ERROR LOCATING TIOT ENTRY FOR DDNAME=cccccccc**  
**Reason:** Internal error.  
**Action:** Contact INNOVATION for assistance.
- FDRS05\*\* ERROR LOCATING JFCB IN SWA FOR DDNAME=cccccccc**  
**Reason:** Internal error.  
**Action:** Contact INNOVATION for assistance.
- FDRS06\*\* UNSUPPORTED DEVICE FOR BACKUP DATA SET – DEVICE CLASS=xx,DEVICE TYPE=xx**  
**Reason:** The BACKUPUNIT specified does refer to a disk or tape device.  
**Action:** Specify a valid BACKUPUNIT and rerun the job.
- FDRS07\*\* TARGET DATA SET NOT EMPTY – DSN=c...c**  
**Reason:** A RECOVER command was executed and the indicated data set has already been reloaded.  
**Action:** The data set is bypassed.
- FDRS08\*\* RE-USE TERMINATED**  
**Reason:** An attempt to dynamically reuse a VSAM data or index component has been terminated due to the error described by the preceeding message.  
**Action:** Refer to the preceeding message.
- FDRS09\*\* REORGCKP DD REQUIRED FOR RECOVERY – PROCESSING TERMINATED**  
**Reason:** A RECOVER command was executed without the JOBNAME keyword and a REORGCKP DD statement was not found.  
**Action:** Provide the REORGCKP DD statement. If checkpoint processing is not required, use the NOCKPT keyword.
- FDRS10\*\* REORGLOG DD REQUIRED FOR RECOVERY – PROCESSING TERMINATED**  
**Reason:** A RECOVER command was executed without the JOBNAME keyword and a REORGLOG DD statement was not found.  
**Action:** Provide the REORGLOG DD statement. If log file processing is not required, use the NOLOG keyword.
- FDRS11\*\* RECOVERY TERMINATED**  
**Reason:** A RECOVER command has failed due to the errors described by the preceeding message.  
**Action:** Refer to the preceeding message.
- FDRS12\*\* DATA SET TYPE HAS CHANGED FROM OLD TYPE TO NEW TYPE**  
**Reason:** A RECOVER command was executed and the data set type has changed since FDRREORG backed up the data set.  
**Action:** The data set is not recovered.



- FDRS13\*\* TARGET DATA SET IS NOT A VSAM KSDS – DSN=c...c**  
**Reason:** A RECOVER command was executed and a VSAM cluster is no longer a KSDS.  
**Action:** The data set is not recovered.
- FDRS14\*\* TARGET DATA SET IS NOT A IAM FILE – DSN=c...c**  
**Reason:** A RECOVER command was executed and an IAM data set is no longer in IAM format.  
**Action:** The data set is not recovered.
- FDRS15 CHECKPOINT | LOG FILE ALLOCATED – DSN=c...c**  
**Reason:** Informational.  
**Action:** None.
- FDRS16\*\* CHECKPOINT | LOG FILE ALLOCATED ON UNSUPPORTED DEVICE**  
**Reason:** The device allocated for the checkpoint or log file was not a DASD device.  
**Action:** Specify a unit name that refers to DASD devices.
- FDRS17\* CHECKPOINT | LOG FILE DOES NOT EXIST FOR THIS JOB**  
**Reason:** A RECOVER command was executed with the JOBNAME keyword and the indicated file does not exist.  
**Action:** Probably none. FDRREORG will delete the checkpoint or log file if they do not contain an entry for a data set which requires recovery.
- FDRS18\*\* RECOVERY NOT POSSIBLE – A VALID CHECKPOINT OR LOG FILE COULD NOT BE FOUND**  
**Reason:** A RECOVER command was executed with the JOBNAME keyword and FDRREORG could not find a checkpoint or log file in the catalog.  
**Action:** Verify that the specified jobname is correct.
- FDRS19\* CHECKPOINT | LOG FILE IS OLDER THAN CHECKPOINT | LOG FILE AND WILL NOT BE USED**  
**Reason:** A RECOVER command was executed with the JOBNAME keyword and FDRREORG found a checkpoint and a log file in the catalog. After inspecting the date and time stamps, FDRREORG determined that both files are not from the same job.  
**Action:** FDRREORG will use the most current file only.
- FDRS20\*\* RACF INFORMATION DOES NOT EXIST – UNABLE TO SUBSTITUTE USER | GROUP ID**  
**Reason:** &RACFUID or &RACFGID was used with the BACKUPGROUP, BACKUPINDEX, CKPTPREFIX, LASTAPEPREFIX, or LOGPREFIX keywords and the user id or group id was missing from the ACEE control block.  
**Action:** If you do not have a security system such as RACF installed, you may be able to utilize this feature if you are running MVS/ESA by providing a USER or GROUP parameter on the JOB card. If you do have a security system, then a system error has probably occurred. Have the system security administrator or system programmer check that the appropriate user and group information is being provided.
- FDRS21\*\* BACKUPALLOC | CKPTALLOC | LOGALLOC =UNIT NOT VALID – BACKUPUNIT | CKPTUNIT | LOGUNIT IS NULL**  
**Reason:** The UNIT option was requested or defaulted for the BACKUPALLOC, CKPTALLOC, or LOGALLOC keywords and the related UNIT keyword default was NULL.  
**Action:** Set a default value for the appropriate UNIT keyword in the FDRREORG option table by running the FDRREOZO option table change utility, or specify a value at run time.
- FDRS22\*\* BACKUPALLOC | CKPTALLOC | LOGALLOC =SMS NOT VALID – BACKUPSTORCLASS | CKPTSTORCLASS | LOGSTORCLASS IS NULL**  
**Reason:** The SMS option was requested or defaulted for the BACKUPALLOC, CKPTALLOC, or LOGALLOC keywords and the related STORCLASS keyword default was NULL.  
**Action:** Set a default value for the appropriate STORCLASS keyword in the FDRREORG option table by running the FDRREOZO option table change utility, or specify a value at run time.

**FDRS23\*\* BACKUPSTRING REQUIRES AN OLD AND NEW STRING – SPECIFY BACKUPSTRING=(oldstr,newstr)**

**Reason:** The BACKUPSTRING keyword was coded incorrectly.  
**Action:** Correct the error and rerun the job.

**FDRS24\*\* REORG OR SIMULATE COMMAND MUST PRECEED SELECT | EXCLUDE**

**Reason:** A SELECT or EXCLUDE card was encountered before a REORG or SIMULATE card.  
**Action:** SELECT and EXCLUDE cards must follow a REORG or SIMULATE card. Correct the error and rerun the job.

**FDRS25\*\* RECOVER COMMAND NOT SUPPORTED AFTER A REORG OR SIMULATE COMMAND**

**Reason:** Because of the basic differences in how the checkpoint and log files are used by a REORG and RECOVER function, it is not possible to perform both functions in a single execution.  
**Action:** Run the RECOVER function as a separate job or jobstep.

**FDRS26\*\* REORG OR SIMULATE COMMAND NOT SUPPORTED AFTER A RECOVER COMMAND**

**Reason:** Because of the basic differences in how the checkpoint and log files are used by a REORG and RECOVER function, it is not possible to perform both functions in a single execution.  
**Action:** Run the REORG or SIMULATE function as a separate job or jobstep.

**FDRS27\* PDS BYPASSED DUE TO UPDATEDPDS=NO – DSN=c...c**

**Reason:** The UPDATEDPDS option was specified or defaulted to NO and a partitioned data set was selected for compression that did not have a current backup (the update indicator in the data sets format 1 DSCB was set).  
**Action:** The data set is bypassed.

**FDRS28\*\* CHECKPOINT | LOG file NOT ALLOCATED ON A CYLINDER BOUNDARY**

**Reason:** The checkpoint and log files are dynamically allocated by FDRREORG as 1 cylinder data sets. However, after dynamically allocating either file, FDRREORG detected that they were not allocated on a cylinder boundary.  
**Action:** Because of the additional overhead required to manage these files across cylinder boundaries, FDRREORG will terminate. The most probable cause for this error is a user allocation exit, or allocation control system, changing the allocation to a track allocation. You must allow the FDRREORG checkpoint and log file to be allocated as 1 cylinder data sets.

**FDRS29\* CLUSTER OR AIX BYPASSED – CAN NOT BE REUSED – DSN=c...c**  
**CLUSTER OR AIX CAN NOT BE REUSED BUT WILL BE BACKED UP – DSN=c...c**

**Reason:** A VSAM KSDS or AIX was selected for reorganization and could not be reused. If a data set is not defined with the REUSE attribute, it can only be dynamically reused if it is a single volume data set with no related alternate indexes. If VSAMDEFINE=IFREQ is specified, multi-volume KSDS^s with no related alternate indexes can be deleted and defined by FDRREORG.  
**Action:** If the ALWAYSBACKUP option was not specified, you will receive the first form of this message and the data set will be bypassed. If the ALWAYSBACKUP option was specified, the data set will be backed up but not reorganized.

- FDRS30\* COMPRESS | SIMREORG NOT POSSIBLE – DATA SET IN USE – DSN=c...c**  
**Reason:** A partitioned data set selected for compression or simulated compression was in use by another job or user.  
**Action:** The data set is bypassed. If PDSDISP was specified or defaulted to OLD, then any attempt at compression or simulated compression will fail if any allocations exist for the data set. If PDSDISP was specified as SHR, then some other user has it allocated exclusive with DISP=OLD.
- FDRS31\* DATA SET HAS NEVER BEEN UPDATED – BYPASSED – DSN=c...c**  
**Reason:** A VSAM or IAM data set was selected for reorganization that had no adds, deletes, or updated, and the NOUPDATES option was specified as, or defaulted to NO.  
**Action:** To avoid reorganizing data sets that do not require reorganization, the data set is bypassed.
- FDRS32\* DATA SET HAS NOT BEEN LOADED – BYPASSED – DSN=c...c**  
**Reason:** A VSAM or IAM data set was selected for reorganization but the data set has been defined and never loaded.  
**Action:** The data set is bypassed.
- FDRS33\* UPDATE INHIBIT FLAG IS ON – DATA SET BYPASSED – DSN=c...c**  
**UPDATE INHIBIT FLAG IS ON – DATA SET WILL BE BACKED UP ONLY – DSN=c...c**  
**Reason:** A VSAM data set was selected for reorganization and the data sets update inhibit flag is on.  
**Action:** If the ALWAYSBACKUP option was not specified, you will receive the first form of this message and the data set will be bypassed. If the ALWAYSBACKUP option was specified, you will receive the second form of this message and the data set will be backed up but not reorganized. It is possible to receive this message if another FDRREORG is running and is processing this data set. FDRREORG sets the update inhibit flag to prevent the data set from being updated while it is being reorganized. If another FDRREORG is not running, then the update inhibit flag was probably set manually with an IDCAMS ALTER command. The update inhibit flag will have to be reset with IDCAMS before FDRREORG will reorganize this data set.
- FDRS35\*\* BACKUP DATA SET WOULD BE CATALOGED IN THE MASTER CATALOG – BACKUP DSN=c...c**  
**Reason:** The ALIASCHECK option was specified as or defaulted to YES and an alias or multi-level alias does not exist for the high level qualifier of the generated backup data set name.  
**Action:** Backup processing is terminated.
- FDRS36\*\* BACKUP=TEMP NOT ALLOWED WITH ALWAYSBACKUP OR NOREORG**  
**Reason:** The intent of the ALWAYSBACKUP or NOREORG options is to ensure that backups always exist for any data sets selected.  
**Action:** Processing is terminated.
- FDRS37\*\* RETRY ALREADY PENDING FOR THIS DSN ON ANOTHER VOLUME – DSN=c..c**  
**Reason:** DSNRETRY was specified as ENQ or WAIT and a previous request for the same partitioned data set name had already been issued from another volume. Because the system does not manage SYSDSN ENQ^s on a volume basis, it is not possible to have more than one pending request.  
**Action:** The data set will be bypassed.
- FDRS38\*\* ERROR ALLOCATING VOLUMES FOR DEFINE – DSN=c...c**  
**Reason:** An error occurred while allocating the volumes required to redefine a VSAM data set.  
**Action:** Refer to the IKJ messages that follow this message and take the appropriate action. The RECOVER command will have to be used to complete processing for the indicated data set. If there is a problem with the volume(s) required to successfully redefine the data set, the data set should be defined before using the RECOVER command.

**FDRS39\*\* VOLUME vvvvvv NO LONGER MOUNTED – DEFINE TERMINATED – DSN=c..c**

**Reason:** A volume required to redefine a VSAM data set is no longer online.

**Action:** Use the RECOVER command to complete processing for the indicated data set when the required volume(s) are available. If there is a problem with the volume(s) required to successfully redefine the data set, the data set should be defined before using the RECOVER command.

**FDRS40\*\* UCBSCAN ERROR DURING DEFINE – R15=ccc, REASON=rrr, DSN=c..c**

**Reason:** A failure occurred using the UCBSCAN service.

**Action:** Contact Innovation for assistance.

**FDRS41\*\* RECORDS READ LESS THAN NUMBER OF RECORDS IN STATISTICS BLOCK – DSN=c..c  
RECORDS READ=n..n, RECORDS EXPECTED=n..n**

**Reason:** To prevent reloading a damaged file, FDRREORG compares the number of records read during the backup with the number of records contained in the catalog statistics block for an IAM or VSAM data set. If the number of records read is less than the number of records in the statistics block, FDRREORG will not reload the data set.

**Action:** Research all activity against the indicated data set. If a system failure occurred while records were being deleted, it is possible that the statistics block was not updated to reflect the deleted records. If the data set is not damaged, FDRREORG can be forced to reorganize these data sets by specifying NORCOUNTERR on the REORG statement.

**FDRS43\*\* UNEXPECTED DEVICE FOR BACKUP DATASET – DEVICE CLASS=cc, DEVICE TYPE=cc**

**Reason:** The POOLDASD option in the FDRREORG option table has been set to YES and an undefined unit name was used for allocation. The device allocated was not a DASD device.

**Action:** FDRREORG processing is terminated.

**FDRS44\*\* UNABLE TO REDEFINE SMS MANAGED CLUSTER – SMS NOT ACTIVE**

**Reason:** An attempt was made to redefine an SMS managed cluster and SMS is not active.

**Action:** Activate SMS and rerun the job.

**FDRS45\* DATASET IS EMPTY AND WILL NOT BE REORGANIZED – DSN=c..c**

**Reason:** A previously loaded VSAM cluster or IAM dataset no longer has any records.

**Action:** The dataset is bypassed.

**FDRS46\*\* NO DATASETS SELECTED**

**Reason:** No datasets matched the provided selection criteria.

**Action:** Check the select/exclude control cards and rerun the job.

**FDRS48\*\* REVERTING TO ORIGINAL DEFINE – DSN=c..c**

**Reason:** An error occurred while attempting to redefine a VSAM cluster and keywords were specified to change the original definition.

**Action:** FDRREORG will revert to the parameters used for the original define. Review and correct the requested changes and rerun the job to implement the desired changes.

**FDRS49\*\* PRI=nnn, SEC=nnn, BLKSIZE=nnn, . . .**

**Reason:** Issued after message FDRR94 to list the parameters used for the failed dynamic allocation.

**Action:** Refer to the IKJ message(s) preceeding this message.

- FDRS50\*\* NONUNIQUE KEY DETECTED FOR UNIQUEKEY AIX – DSN=c . . . c**  
**Reason:** Multiple occurrences of the same alternate key has been detected for an Alternate Index defined with the UNIQUEKEY attribute.  
**Action:** The alternate index build is terminated. This message is equivalent to the IDC1645I message issued by the BLDINDEX command of IDCAMS.
- FDRS52\*\* ALTERNATE INDEX HAS MORE THAN 3 PATHS – DSN=C . . . C**  
**Reason:** FDRREORG does not support Alternate Index datasets with more than 3 paths.  
**Action:** The base cluster and all related objects are bypassed.
- FDRS53\*\* EXCESS PRIME KEYS DETECTED DURING BLDAIX – DSN=C . . . C**  
**Reason:** The maximum recordsize of an Alternate Index was not large enough to contain all of the alternate keys.  
**Action:** The alternate index is created with only the alternate keys that would fit. This message is equivalent to the IDC1646I message issued by the BLDINDEX command of IDCAMS.
- FDRS54\*\* AIX IN USE DSN=c . . . . c**  
**Reason:** A VSAM KSDS with an alternate index has been selected for reorganization and the alternate index is in use.  
**Action:** The data set is bypassed.
- FDRS55 RECORDS READ=n . . . n, RECORDS LOADED=n . . . n**  
**Reason:** Informational message for IAM and VSAM data sets. This message is issued if RECORDCOUNTS=YES has been set in the FDRREORG option table.  
**Action:** None.
- FDRS98 DATA SET HAS nnnnn MEMBERS nnnnn DIRECTORY BLOCKS USED ON nnnnn BLOCKS UNUSED**  
**Reason:** FDRCOPY REORG was executed with the LIST=YES operand or REORG was invoked by the IEBCOPY interface and LIST=NO was not specified. The message gives PDS directory statistics.
- FDRS99 MEMBER member IN PLACE | MOVED | IS ALIAS ON**  
**Reason:** FDRCOPY REORG was executed with the LIST=YES operand or REORG was invoked by the IEBCOPY interface and LIST=NO was not specified. The message shows the status of every member in the PDS. IN PLACE means that the member was not moved.

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# FDR

## FAST DUMP RESTORE

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### **INTERACTIVE INSTALLATION PROCEDURE**

ABR may be installed using an interactive installation procedure, documented in [Section 92](#). If TSO and ISPF are available, we strongly recommend that you use the interactive installation and customization procedure. The interactive procedure is available for ABR users and all Trial tapes.

If you use the interactive installation procedure in [Section 92](#), then disregard [Section 90](#), except where it is specifically referenced from [Section 92](#).

### **TESTING FDRREORG**

If you are interested in only testing FDRREORG, then you may use the Manual Installation Procedure.

Go to [Section 90.01A](#), Page 1310.1 for the installation instructions for FDRREORG.

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**90.01 FDR DASD MANAGEMENT INSTALLATION INTRODUCTION**

The INNOVATION DASD Management Facility program library is distributed on tape in IEBCOPY format. During initial installation, all program modules must be loaded into a common library. It is required that an authorized library be used, as certain modules are linked with an authorization code of 1. A library is authorized if it is accessed via the LINKLIST or its name is in SYS1.PARMLIB member IEAAPFxx. Under MVS/XA or MVS/ESA, if the LNKAUTH=APFTAB option is specified in IEASYSxx, then even a library accessed via the LINKLIST has to be listed in IEAAPFxx to be authorized.

**GENERAL** The product distribution tape is recorded either at 6250 BPI on a 3420 reel, or at 38000 BPI on a 3480 cartridge. The tape is in SL format with a volume serial number of FDR52T(P). The tape volume FDR52T contains a trial version of the library which is date protected and will expire on the date shown on the external tape label. The tape volume FDR52P contains the production version of the product library. There are no date protected modules in the production library.

The distribution tape consists of nine uniquely named data sets when the ABR option is included and four data sets for just FDR with or without the CPK option.

STAND-ALONE RESTORE (SAR) is contained in the first file, formatted as unblocked 80 character records. This file's data set name is 'SAR'. Since the installation tape is standard labeled, the IPL function must be performed five times to bypass the labels and to load the STAND-ALONE program from this tape. The user may create an unlabeled tape containing the STAND-ALONE program by using the STAND-ALONE loader utility (FDRSARLR) or by using IEBGENER to copy the STAND-ALONE program from file one. This file may also be used to create an IPLable STAND-ALONE program on disk. [See Section 30.20](#) for details.

**INSTALLATION** The steps for installing the FDR DASD Management System are listed below, for a new or existing user and depending on whether or not you have ABR.

Use the keys as a quick reference and check list for installing the FDR system. The order of the steps is a suggestion; you do not have to do the steps in the order shown (except for Steps 1 and 2), but you do have to do all of them for a complete installation.

**TRIAL CUSTOMER** If you are a trial FDR customer, use the procedure for a new FDR/CPK/ABR/FDRREORG user. The trial copy will expire on the date specified on the installation tape, unless it is extended by INNOVATION. Once the trial period is over and you have purchased the product, re-install the FDR system from the production tape supplied by INNOVATION before the expiration date.

The ABR catalog, ARCHIVE Control file and the setting of the ABR disk volume processing options (program FDRABRM) are not affected by the re-installation of the FDR library from the production tape. The FDR Global Options table (module FDROPT), COMPAKTOR Unmovable Table (module FDRCPKUM), ABR PROTECT Lists and ABR RESTORE Allocation Control List can be copied from the test library.

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## 90.01 CONTINUED . . .

**NEW USER—  
FDR/CPK** The FDR or FDR/CPK programs are easy to install. The key to installing the FDR system is to follow the next six steps:

- 1 Install the Installation Control Library ([Section 90.02](#)). This library contains JCL streams for subsequent steps.
- 2 Install the program library ([Section 90.03](#)). This library contains the executable programs for the FDR system. This library must be an authorized library.
- 3 Optionally, load the user documentation onto disk ([Section 90.06](#)). This step will enable you to read this manual from a terminal or to print additional copies.
- 4 Set your installation options in the Global Option Table, using program FDRZAPOP ([Section 91](#)). The installation options include security features, user exits, control statement defaults, and other processing options. You do not have to run FDRZAPOP if the options you want are all the defaults.
- 5 If you have COMPAKTOR, set up the COMPAKTOR Unmovable Table ([Section 91.04](#)). This table specifies data sets that COMPAKTOR will leave in the same location when it reorganizes disk volumes. This table should include your LINKLIST data sets, Tape Management Catalog (if you have one), and the other data sets listed in [Section 40.24](#) that are not ENQ'ed by the system.
- 6 You are now ready to test the FDR system. [Sections 10](#) through [40](#) of the manual detail the JCL, control statements and options for running FDR (full volume component), FDRDSF and FDRCOPY (data set component), SAR (stand alone component) and CPK (volume reorganization and release component).

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## 90.01 CONTINUED . . .

**EXISTING  
USER—  
FDR/CPK**

The following six steps are to be used to install a new version of the FDR system, if you are currently using FDR/CPK or FDR only. Prior to installing the new version of the FDR system, please review the Summary of Modifications ([Section 01](#)).



1 Install the Installation Control Library ([Section 90.02](#)). This library contains JCL streams for subsequent steps.



2 Install the program library ([Section 90.03](#)). This library contains the executable programs for the FDR system. Do not overlay your existing FDR library until you have completed the testing of the new version. Since a STEPLIB DD statement will be used, the test FDR library must be authorized by placing its name in SYS1.PARMLIB member IEAAPFxx.



3 Optionally, load the user documentation onto disk ([Section 90.06](#)). This step will enable you to read this manual from a terminal or to print additional copies.



4 Set your installation options in the Global Option Table, using program FDRZAPOP ([Section 91](#)). The installation options include security features, user exits, control statement defaults, and other processing options.

To see what options your installation is currently using, run program FDRZAPOP with the PRINT command ([Section 91](#)) against the program library for the previous version. If any of the options are not the defaults, set the options by running FDRZAPOP against the program library for the new version. You do not have to run FDRZAPOP if all of the options used at your installation are the defaults.



5 If you have COMPAKTOR, set up the COMPAKTOR Unmovable Table ([Section 91.04](#)). This table specifies data sets that COMPAKTOR will leave in the same location when it reorganizes disk volumes. This table should include your LINKLIST data sets, Tape Management Catalog (if you have one), and the other data sets listed in [Section 40.24](#) that are not ENQ'ed by the system.

To see what data sets your installation currently lists in the Unmovable Table, run program FDRZAPOP against the previous version program library with the command: PRINT CPKUNMOV.

You may either (A) copy module FDRCPKUM to the new FDR program library from the program library for the previous release, or (B) recreate the table by running FDRZAPOP against the new library.

The source code for module FDRCPKUM is supplied in the Installation Control Library. You may change the source code to allow more entries and then assemble and linkedit the module.



6 You are now ready to test the new version of FDR/CPK. A STEPLIB DD statement should be used to point to the FDR library containing the new version. Once the testing has been completed, reinstall or copy the FDR programs into the production library or replace the previous FDR library name with the new one in your system's LINKLIST. The FDR Global Options table (module FDROPT) and COMPAKTOR Unmovable Table (module FDRCPKUM) can be copied from the test library if you re-install.

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## 90.01 CONTINUED . . .

NEW USER—  
FDR/CPK/ABR  
AND  
FDRREORG

If you are running TSO with ISPF, INNOVATION recommends using the new installation procedure in [Section 92](#), instead of the procedure below.



1 Install the Installation Control Library ([Section 90.02](#)). This library contains JCL streams for subsequent steps, and other helpful members.



2 Install the program library ([Section 90.03](#)). This library contains the executable programs for the FDR system. This library must be an authorized library.



3 Optionally, load the user documentation onto disk ([Section 90.06](#)). This step will enable you to read this manual from a terminal or to print additional copies.



4 Set your installation options in the Global Option Table, using program FDRZAPOP ([Section 91](#)). The installation options include security features, user exits, control statement defaults, and other processing options. You do not have to run FDRZAPOP if the options you want are all the defaults.

At this time the user should decide the high level index name the DASD Management system will use for the cataloging of its backup files and special dsnames. The default value is 'FDRABRÖ.

Another option that is especially important to review before you start to set your ABR disk volume processing options is the field used for recording OLDBACKUP information. **INNOVATION strongly recommends that you set OLDBOFF=62 and OLDBENT=13.** For further information, [See Section 91.04](#).

If your installation has a tape management system, such as TMS (CA-ONE) or TLMS, enable the TMS option.



5 If you have COMPAKTOR, set up the COMPAKTOR Unmovable Table ([Section 91.04](#)). This table specifies data sets that COMPAKTOR will leave in the same location when it reorganizes disk volumes. This table should include your LINKLIST data sets, Tape Management Catalog (if you have one), and the other data sets listed in [Section 40.24](#) that are not ENQ'ed by the system.



6 Optionally, set up the ABR Protect Lists and the ABR RESTORE Allocation Control List ([Section 91](#)). These lists can be used to exclude specified data sets from various types of ABR processing, and control volume selection for ABR RESTORES.



7 Create the ABR catalog ([Sections 90.16 through 90.19](#)). The ABR catalog will contain entries for backup files created by ABR, and for scratched data sets recorded by the DADSM Pre-processing exit.



8 Set the ABR disk volume processing options ([Sections 90.20 through 90.26](#)). Any disk volume that is to be backed up or ARCHIVED by ABR must have its ABR processing options set using program FDRABRM. This program will create a MODEL DSCB on the specified volumes, which will control the ABR processing for the volume. In addition, ABR will use two reserved bytes in the DSCB for each data set on the volume. Setting the ABR processing options does not affect any data set currently on the volume. If you change your mind about the ABR processing options, you can change the options at any time ([Section 55](#)).



9 If you intend to do ARCHIVING, create the ARCHIVE Control file ([Sections 90.27 through 90.30](#)). The ARCHIVE Control file will contain entries for data sets ARCHIVED by ABR.

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## 90.01 CONTINUED . . .



If you have TSO/ISPF, install the ABR ISPF Dialog Support ([Section 56](#)). The Dialog Support provides ISPF panels that give end-users easy access to most of the user-oriented functions of ABR.

Under ISPF option 6, enter the command:

LOAD 'fdr-program-library(FDRLOAD)Ö

and go to [Section 92.03](#) for instructions on loading the ISPF dialog libraries.



If you have TSO but you do not have ISPF, install the ABR TSO CLISTs ([Section 90.13](#), only in the machine-readable version of the manual). These CLISTs are an alternate way to give end-users easy access, although not as easy as the ISPF panels, to most of the user-oriented functions of ABR.



If it is not practical to install the Operating System exits at this time, you can begin testing many of the batch and TSO functions within the FDR system. For example, the running of incremental backups and ARCHIVEs does not require the exits to be installed, nor do most of the functions that are requested from the ISPF Panels.



Set up the dynamic installation of the ABR MVS Operating System exits ([Sections 92.50 through 92.52](#)). Although these exits are not required for ABR to function, they provide very important additional functions. Also, if your Operating System is at a lower level than MVS/DFP Version 3, use SMP to install the modification to record the update indicator and last reference date for ICF VSAM.

A. CATALOG LOCATE EXIT and DATA SET NOT FOUND EXIT ([Section 52.20](#)). These exits implement the 'AUTOMATIC RECALLÖ function of ABR. With these exits installed, a reference, from either a batch job or a TSO user, to a data set that has been ARCHIVED, will cause the data set to be automatically restored. If these exits are not installed, any restore of an ARCHIVED data set must be explicitly requested.

B. DADSM PRE-PROCESSING EXIT ([Section 92.60](#)). The main purpose of the DADSM Pre-processing exit is to record ABR backup information in the ABR SCRATCH catalog for any data sets that are SCRATCHed or RENAMED by programs other than FDRABR and that have ABR backups. With the DADSM Pre-processing exit installed, a user can request the restore of a data set that has been SCRATCHed or RENAMED simply by specifying the data set name. If this exit is not installed, the user must tell ABR the generation and cycle on which the data set was backed up.

C. Modification to record the Update Indicator and the Last Reference Date for ICF VSAM ([Section 90.12A](#)) (only for MVS/370 DFP and MVS/XA DFP, Version 1 or 2; included in the Operating System in MVS/DFP Version 3 or higher). This modification activates an optional function of the Operating System. With this or an equivalent modification installed, ABR can do incremental backups of ICF VSAM, and can ARCHIVE ICF VSAM based on Last Reference Date. Otherwise, these functions are not available. This modification is not available for dynamic installation, but must be installed with SMP, in order to guarantee the continued time stamping of ICF VSAM data sets in IPLs where dynamic installation does not take place.



You are now ready to do full testing of the FDR system. [Sections 10 through 40](#) of the manual detail the JCL, control statements and options for running FDR, FDRDSF, FDRCOPY, FDRREORG, SAR and CPK. An installation using ABR will seldom have occasion to execute FDR or FDRDSF directly. [Sections 50 through 56](#) of the manual detail the JCL, control statements and options for running ABR, the DASD Management portion of the FDR system.

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## 90.01 CONTINUED . . .

**EXISTING  
USER—FDR/  
CPK/ABR  
AND  
FDRREORG**

The following steps should be used to install a new version if you are currently a user of the FDR system. This version of the FDR system can co-exist with earlier versions during testing. Prior to installing the new version of the FDR system, please review the Summary of Modifications ([Section 01](#)).



**If you are running TSO with ISPF, INNOVATION recommends using the interactive installation procedure in [Section 92](#), instead of the procedure below.**

Install the Installation Control Library ([Section 90.02](#)). This library contains JCL streams for subsequent steps, and other helpful members.



Install the program library ([Section 90.03](#)). This library contains the executable programs for the FDR system. Do not overlay your existing FDR library until you have completed the testing of the new version. Since a STEPLIB DD statement will be used, the test FDR library must be authorized by placing its name in SYS1.PARMLIB member IEAAPFxx.



Optionally, load the user documentation onto disk ([Section 90.06](#)). This step will enable you to read this manual from a terminal or to print additional copies.



Set your installation options in the Global Option Table, using program FDRZAPOP ([Section 91](#)). The installation options include security features, user exits, control statement defaults, and other processing options.

To see what options your installation is currently using, run program FDRZAPOP with the PRINT command ([Section 91](#)) against the program library for the previous version. If any of the options are not the defaults, set the options by running FDRZAPOP against the program library for the new version. You do not have to run FDRZAPOP if all of the options used at your installation are the defaults.

**Warning: If you are currently using the field at offset 78 to record OLDBACKUP information, INNOVATION strongly recommends that you convert to using the field at offset 62, by (1) setting OLDBOFF=62 and OLDBENT=13, and (2) running the MAINT command of program FDRABRM to move the OLDBACKUP information to the new field. For further information, [See Sections 91.04 and 55.04](#).**



If you have COMPAKTOR, set up the COMPAKTOR Unmovable Table ([Section 91.04](#)). This table specifies data sets that COMPAKTOR will leave in the same location when it reorganizes disk volumes. This table should include your LINKLIST data sets, Tape Management Catalog (if you have one), and the other data sets listed in [Section 40.24](#) that are not ENQ'ed by the system.

To see what data sets your installation currently lists in the Unmovable Table, run program FDRZAPOP against the previous version program library with the command: PRINT CPKUNMOV. You may either (A) copy module FDRCPKUM to the new FDR program library from the program library for the previous release, or (B) recreate the table by running FDRZAPOP against the new library.

The source code for module FDRCPKUM is supplied in the Installation Control Library. You may change the source code to allow more entries and then assemble and linkedit the module.

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## 90.01 CONTINUED . . .



If you are currently using the ABR PROTECT lists and/or RESTORE Allocation Control List ([Section 91.05](#)), you may either (A) copy modules FDRPROTA, FDRPROTD, FDRPROTR, FDRPROTS and FDRALLOC to the new FDR program library from the program library for the previous release, or (B) recreate all of these lists by running FDRZAPOP against the new library.

The source code for the PROTECT lists and the RESTORE Allocation Control List is supplied in the Installation Control Library. You may change the source code to allow more entries and then assemble and linkedit the module.



If you have ISPF, install the ABR ISPF Dialog Support. If you had installed the Dialog Support previously, install the new version in separate libraries for testing. Once the testing is complete, you must re-install the Dialog Support in the production libraries.

Under ISPF option 6, enter the command:

LOAD 'fdr-program-library(FDRLOAD)'

and go to [Section 92.03](#) for instructions on loading the ISPF dialog libraries.



If your installation uses the ABR TSO CLISTs ([Section 90.13](#), only in the machine-readable version of the manual), and you still have TSO without ISPF, you need not re-install the CLISTs, as they have not changed since the beginning of V 5.0.



If it is not practical to install the new version of the Operating System exits at this time, you can begin testing many of the batch and TSO functions within the FDR system. For example, the running of incremental backups and ARCHIVES does not require the exits to be installed, nor do most of the functions that are requested from the ISPF Panels. A STEPLIB DD statement should be used to point to the FDR library containing the new version.

If you are currently running with the SMP-installed ABR Operating System exits from an earlier release, **we strongly recommend that you convert to the dynamic installation of the exits.** See Key 10 for conversion consideration. The FDR Global Options table (module FDROPT), COMPAKTOR Unmovable Table (module FDRCPKUM) and the ABR PROTECT Lists and ABR RESTORE Allocation Control List can be copied from the test library if you re-install.

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## 90.01 CONTINUED . . .



Set up the dynamic installation of the ABR MVS Operating System exits ([Sections 92.50 through 92.52](#)). The exits that are available for dynamic installation are the CATALOG LOCATE EXIT, the DATA SET NOT FOUND EXIT, and the DADSM PRE-PROCESSING EXIT.

Installations where the ABR Operating System exits from an earlier release are currently installed with SMP, must remove the old ABR exits before attempting dynamic installation. Remove the old ABR exits from the system using the SMP procedures documented in Sections 90.11, 90.12, and 90.12B of the manual for the release from which the exits were installed.

Installations where the ABR Operating System exits from an earlier release (V 5.0E or higher) are currently installed dynamically, should test the new version of the exits using the procedure in [Section 92.52](#). After this testing has been completed, reinstall or copy the FDR programs into the production library or replace the previous FDR library name with the new one in your system's LINKLIST. The FDR Global Options table (module FDROPT), COMPAKTOR Unmovable Table (module FDRCPKUM) and the ABR PROTECT Lists and ABR RESTORE Allocation Control List can be copied from the test library if you re-install. Placing the program library for the new release into LINKLIST, with the dynamic installation options set in FDROPT and with IEFSSNxx set up, will automatically cause the Operating System exits from the new release to be dynamically installed at the next IPL.

The modification to record the Update Indicator and the Last Reference Date for ICF VSAM ([Section 90.12A](#)) (only for MVS/370 DFP and MVS/XA DFP, Version 1 or 2) has not been changed. If this modification was previously installed in your system, it is not necessary to re-install it. If you install MVS/DFP Version 3 or higher, then the ICF VSAM modification will no longer be needed and should not be installed; in DFP V3, the Operating System will record the update indicator and last reference date as a default. The ICF VSAM modification is not available for dynamic installation, but must be installed with SMP, in order to guarantee the continued time stamping of ICF VSAM data sets in IPLs where dynamic installation does not take place.

You have now completed the production installation of the new version.

## 90.01A FDRREORG ONLY — INSTALLATION PROCEDURE

**THIS INSTALLATION PROCEDURE CAN BE USED BY AN EXISTING FDR CUSTOMER WHO WANTS TO ONLY TEST FDRREORG OR A NON-FDR CUSTOMER WHO ONLY WANTS TO TEST FDRREORG.**

**NEW USER —  
FDRREORG**

The FDRREORG program is easy to install. The key to installing the FDRREORG system is to follow the next six steps:



Install the Installation Control Library ([Section 90.02](#)). This library contains JCL streams for subsequent steps.



Install the program library ([Section 90.03](#)). This library contains the executable programs for the FDRREORG system. This library must be an authorized library. **If you are an existing FDR user, do not overlay your existing FDR library.**



Optionally, load the user documentation onto disk ([Section 90.06](#)). This step will enable you to read this manual from a terminal or to print additional copies.



Set your installation options in the Global Option Table, using program FDRREOZO ([Section 26.01](#)). You do not have to run FDRREOZO if the options you want are all the defaults.



Optional: To activate the FDRREORG IEBCOPY Intercept using FDRREORG instead of IEBCOPY for PDS compression, [See Section 92.65](#).



You are now ready to test the FDRREORG system. [Sections 21.20](#), [25.01](#) and [26.01](#) of the manual detail the JCL, control statements and options for running FDRREORG and the FDRCOPY REORG command.

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# 90.02 INSTALLING THE INSTALLATION CONTROL LIBRARY

File four of the installation tape contains IEBCOPY input that will create an Installation Control Library. This library supplies the user with JCL streams; TSO CLISTs; source modules that the user may wish to change and re-assemble; and supplementary documentation. The member named 'INDEX' contains a brief functional description of each member within the Installation Control Library.

## DISK SPACE REQUIRE- MENTS

The Installation Control Library must be loaded to a partitioned data set on disk. You may load it to an existing data set (if it has sufficient space and proper DCB attributes) or allocate and load a new one. The following table shows the allocation parameters for the Installation Control Library:

DATA SET	RECFM	LRECL	BLKSIZE	BLOCKS	PDS DIR BLOCKS
IDP.ICLFDR52	FB	80	3120	1200	34

This data set is allocated in blocks so that the system will calculate the correct number of tracks for your device type. If your installation uses a different block size for this data set, you should adjust the number of blocks accordingly.

Note: For ABR users who install the ABR Operating System exits (other than the modification to record the Update Indicator and the Last Reference Date for ICF VSAM) without using dynamic installation, this library must have a block size of 3200 OR LESS because object code members are included from this library during installation of the exits. Otherwise, the blocksize may be any multiple of 80 desired by the user.

## INSTALLA- TION INSTRUCTIONS

Execute the following JCL to load the Installation Control library. The following changes must be made to reflect your environment:

- A) 'DSN=IDP.ICLFDR52' on the SYSUT2 DD statement should be changed to the name you wish to use for the Installation Control Library.
- B) 'VOL=SER=vvvvvv' on the SYSUT2 DD statement must specify a disk volume where the Installation Control Library will be allocated, or may be omitted if the data set will be SMS-managed.
- C) 'UNIT=TAPE' on the SYSUT1 statement must specify a tape drive capable of reading the installation tape that you have received (reel or cartridge).
- D) 'VOL=SER=FDR52T' on the SYSUT1 statement must be changed to 'VOL=SER=FDR52P' if you are loading from a production installation tape.

90.02 INSTALLING THE INSTALLATION CONTROL LIBRARY

```

JOB CONTROL //I CLLOAD      EXEC  PGM=I EBCOPY, REGI ON=1024K
FOR LOADING //SYSPRI NT    DD    SYSOUT=*
LIBRARY      //SYSUT2      DD    DSN=I DP. I CLFDR52,                <-- - USER-CHANGE
//              VOL=SER=vvvvvvv,                <-- - USER-CHANGE
//              UNI T=SYSDA, DI SP=( , CATLG) ,    SEE NOTE 1
//              DCB=( LRECL=80, BLKSI ZE=3120, RECFM=FB) ,
//              SPACE=( 3120, ( 1200, 20, 34) , , , ROUND)
//SYSUT1        DD    DSN=I CL,
//              UNI T=TAPE,                        <-- - USER-CHANGE
//              DI SP=OLD, LABEL=( 4, EXPDT=98000) ,
//              VOL=SER=FDR52T          CHANGE T TO P I F PRODUCTI ON TAPE
//SYSI N         DD    *
                COPY  OUTDD=SYSUT2, I NDD=( ( SYSUT1, R) )
    
```

NOTE 1: To load the members to an existing library,

```

//SYSUT2        DD    DI SP=OLD, DSN=I DP. I CLFDR52                <-- - USER-CHANGE
    
```

**JCL STREAMS** The JCL streams in the Installation Control Library provide the user with procedures for the installation of INNOVATION's.

- ...Product Distribution Tape.
- ...User Documentation PDS.
- ...dynamically installed ABR MVS Operating System exits.
- ...ICF VSAM Modification for Update/Last Reference Date Recording.
- ...ABR Operating System exits for non-MVS Systems.

**SOURCE MODULES** The Installation Control Library provides several members containing source code:

- ...FDRCPKUM – COMPAKTOR Unmovable Table.
- ...FDRPROTA – ABR ARCHIVE Protect List.
- ...FDRPROTD – ABR Incremental Backup Protect List.
- ...FDRPROTR – ABR Data Set Restore Protect List.
- ...FDRPROTS – ABR SUPERSCRATCH Protect List.
- ...FDRALLOC – ABR RESTORE Allocation Control List.

These members are provided in case the user needs to increase the maximum sizes of the tables or lists. They contain instructions on how to use them. JCL for assembly and linkedit, and the source code itself.

**90.03 FDR DASD MANAGEMENT INSTALLATION**

**INSTALLATION** The INNOVATION DASD Management facility program library must be loaded to a partitioned data set on disk. You may load it to an existing dataset (if it has sufficient space and proper DCB) or allocate and load a new one. The following table shows the allocation parameters for the product program library:

<b>DISK SPACE REQUIRE- MENTS</b>	<b>PRODUCT OPTIONS</b>	<b>RECFM</b>	<b>LRECL</b>	<b>BLKSIZE</b>	<b>BLOCKS</b>	<b>PDS DIR BLOCKS</b>
	FDRREORG only	U	n/a	6144	200	34
	COMPAKTOR only	U	n/a	6144	200	34
	FDR only	U	n/a	6144	240	34
	FDR and FDRREORG	U	n/a	6144	280	34
	FDR and CPK	U	n/a	6144	300	34
	FDR, CPK and FDRREORG	U	n/a	6144	320	34
	FDR, CPK and ABR	U	n/a	6144	660	34
	FDR, CPK, ABR & FDRREORG	U	n/a	6144	780	34

This data set is allocated in blocks so that the system will calculate the correct number of tracks for your device type. If your installation uses a different block size for this data set, you should adjust the number of blocks accordingly.

**JOB CONTROL  
FOR LOADING  
LIBRARY** The JCL below is supplied on the Installation Control Library ([See Section 90.02](#)) with a member name of 'FDRLINK'. The JCL in the Installation Control Library reflects the type of product installation tape from which it was loaded.

```
//LOAD      EXEC  PGM=I EBCOPY, REGI ON=1024K
//SYSUT2    DD    DI SP=SHR, DSN=FDR  LOADLI B          <-- - CHANGE
//SYSUT1    DD    DSN=LOAD,
//          VOL=( , RETAI N, SER=FDR52T) , UNI T=TAPE,    <-- - CHANGE TO
                                                         FDR52P I F
                                                         PRODUCTI ON
                                                         TAPE

//          DI SP=OLD, LABEL=( 2, EXPDT=98000)
//SYSI N    DD    *
              COPYMOD OUTDD=SYSUT2, I NDD=(( SYSUT1, R) ) , MAXBLK=6144
```

\*\*\*                    **CAUTION**                    **CAUTION**                    **CAUTION**                    \*\*\*

- 1) For current FDR customers, we recommend that you install this version in an authorized library separate from your current FDR library. Once you have tested this version, then copy the modules into your production library replacing the previous version, or replace the previous FDR library name with the new one in your system's LINKLIST.
- 2) If you are installing a production tape (which has no date protected modules), you must change the installation JCL to reflect this; change the serial from FDR52T to FDR52P. You may need to change UNIT=TAPE to a unit name capable of reading the distribution tape you received (reel or cartridge).
- 3) If the ABR Operating System exits are to be dynamically installed, this program library must be a LINKLIST library for production use. To test these exits (if the exits from an earlier release are currently dynamically installed), [See Section 92.52](#).
- 4) Under MVS/XA, if you have installed the modules into a LINKLIST library, the operator may have to issue the command MODIFY LLA,REFRESH to inform the system of the update. Under MVS/ESA, if you have installed the modules into any library controlled by Library Lookaside, the operator may have to issue the command MODIFY LLA,REFRESH, or preferably MODIFY LLA,UPDATE=xx, to inform the system of the update.
- 5) Please review [Section 90.01](#) before installing the FDR system.

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## 90.04 FDR DASD MANAGEMENT LOAD MODULES

**INSTALLED  
LOAD  
MODULES**

The following modules are placed or replaced into the load module library.

The module named 'FDREXTND' will only be included if the distribution library has date protected trial modules.

The modules listed below are categorized by product and do not correspond to the installation file numbers.

FDR		COMPAKTOR	FDRREORG	ABR	
FDR	FDRDSF *	FDRANALS	FDR\$SORT	F\$REPABR	FDRABR
FDR\$DEBUG *	FDRDSFAL	FDRCPK	FDRBCOPY	F\$REPARC	FDRABRA
FDR\$DCB *	FDRDSFB *	FDRCPKUM	FDRNORG	F\$REPCBK	FDRABRC
FDR\$DYNM	FDRDSFC *	FDRICKDS	FDRNWDSN	F\$REPDTA	FDRABRCM
FDR\$EXCP	FDRDSKTP *	FDRICLTB	FDRRECOM	F\$REPDV1	FDRABRM
FDR\$HELP *	FDRFIXIT	FDRINITS	FDRREOCF	F\$REPDV2	FDRABRUT
FDR\$ISOL	FDRKWDPK *	FDRMAPIT	FDRREOLF	F\$REPDV3	FDRABRV
FDR\$KWIF *	FDRMSS *	FDRPACTS	FDRREOMA	F\$REPDV4	FDRABRVC
FDRABRP	FDROPT *	FDRPRTIT	FDRREOOP	F\$REPDV5	FDRALLOC
FDRABRPT	FDRQUEHP *	FDRRESTR	FDRREOPO	F\$REPDV6	FDRARCD
FDRB	FDRQUEOP *	FDRUNSTR	FDRREORG	F\$REPDV7	FDRARCH
FDRC	FDRQUERY *		FDRREOSG	F\$REPEXR	FDRARCHP
FDRCOMPO	FDRSARLR		FDRREOSV	F\$REPFLD	FDRAUTH
FDRCONCR	FDRSPZAP *		FDRREOUV	F\$REPGEN	FDRCATSR
FDRCONVT	FDRSVC32		FDRREOVP	F\$REPHEX	FDRCHSM
FDRCONVV	FDRTCOPY		FDRREOVT	F\$REPHLP	FDRCNVCL
FDRCONXT *	FDRTKPR		FDRREOZO	F\$REPHLX	FDRECALL
FDRCOPY *	FDRUNLK		FDRUCBLU	F\$REPNDT	FDREPORT
FDRCPARS	FDRZAP *			F\$REPOPT	FDRLOAD
FDRCTMGR	FDRZAPHP *			F\$REPPSL	FDROPSPF
FDRCVSRC *	FDRZAPOP *			F\$REPSLA	FDRPROTA
FDRD	FDRZAPRT *			F\$REPSLR	FDRPROTD
FDRDASVC	IGG019YZ *			F\$REPSUD	FDRPROTR
FDRDEBUG *	JHHOPNYZ *			F\$REPSUI	FDRPROTS
FDRDEVTB *				F\$REPTBL	FDRSIMPR
FDRDMPRT *				F\$REPVC	FDRSRS
FDRDOCPK *				F\$REPXRF	FDRSRSA
				FD\$MSGQF	FDRT\$CAT
				FDR\$CDSN	FDRTSEL
				FDR\$DFEF	FDRT26
				FDR\$ENQ *	FDRT26P
				FDR\$SAFE *	FDRT26S
				FDR\$SRTD *	FDRT26TB
					FDRT26EX
<b>DYNAMIC INSTALLATION MODULES</b>					
				FDRPARE *	FDRSTATS *
				FDRSTART *	FDRVECTB *
<b>OPERATING SYSTEM EXIT MODULES</b>					
		FDRGIVER	FDREXDSN	IGG029DU	
		FDR00024	FDRPRE00	FDRMVSX2	
		FDR026DU	FDRDAS02		

Note: "\*" after module indicates support module shipped with FDRREORG product without any other product options.

## 90.05 DASD MANAGEMENT INSTALLATION QUESTIONS

**QUESTIONS  
REGARDING  
INSTALLATION**

Here are the answers to some common problems that may be encountered after installation of the DASD Management modules.

**Question:** FDR ABENDs with an S913-20 on an MVS system.

**Answer:** The job step was not authorized. Either the PGM= module is not an authorized module, or it was not fetched from an authorized library. (Specifically, the S913-20 ABEND occurs because the non-authorized job step tries to OPEN an EXCP DCB that calls for appendages. Putting the module name IGG019YZ into the authorized appendage list, member IEAAP00 in SYS1.PARMLIB, will avoid this particular ABEND, but it will not avoid the other ABENDs that occur in MVS.)

**Solution:** See NOTE 1 on APF authorization problems. If running an ABR ISPF dialog, see [Section 92.10](#) on APF authorization under ISPF.

**Question:** FDR ABENDs with an S106 on the first execution.

**Answer:** The most common cause for an S106 is that you installed into a LINKLIST library that ran out of space and went to a new extent.

**Solution:** 1) Run with a STEPLIB until the next IPL.  
2) Re-IPL now.

NOTE: Under MVS/XA or MVS/ESA, the commands MODIFY LLA, REFRESH or MODIFY LLA, UPDATE=xx will not fix this problem. When accessing modules through the LINKLIST (i.e. not with a STEPLIB), LLA uses the LINKLIST DEB, which is only built at IPL time.

**Question:** FDR ABENDs with an S338 or S330.

**Answer:** The job step is not authorized. Either the PGM= module is not an authorized module, or it was not fetched from an authorized library. The program tried to RESERVE or ENQ on SYSVTOC, which is a resource available only to authorized programs.

**Solution:** See NOTE 1 on APF authorization problems.

**Question:** COMPAKTOR ABENDs with an S806-8 on module FDRMAPIT.

**Answer:** COMPAKTOR moved the FDR library from which it was being executed; or COMPAKTOR was running from LINKLIST, and moved a library that is earlier in the LINKLIST than the library containing COMPAKTOR.

**Solution:** Prevent COMPAKTOR from moving its own library or any library in LINKLIST by listing these libraries in the COMPAKTOR Unmovable Table ([See Section 91.04](#)).

**Question:** COMPAKTOR (or any FDR program) ABENDs with an S138.

**Answer:** The DD statement for SYSPRINT, SYSMAP, or another output file points to the disk volume being processed.

**Solution:** Change the DD statement not to use a volume being processed.

**NOTE 1 on APF authorization problems:**

- a) If you are running with a STEPLIB or JOBLIB, the STEPLIB or JOBLIB must be an authorized library. To be an authorized library, the data set must be listed in member IEAAPFxx in SYS1.PARMLIB. If the STEPLIB or JOBLIB is a concatenation, then every data set in the concatenation must be authorized for the job step to be authorized.
- b) If you are not running with a STEPLIB or JOBLIB, then you are running from LINKLIST. In most installations, all libraries in LINKLIST are automatically considered authorized libraries when they are accessed without a STEPLIB or JOBLIB. However, under MVS/XA or MVS/ESA, the installation can specify LNKAUTH=APFTAB in IEASYSxx, meaning that LINKLIST libraries are only to be considered authorized if they are listed in IEAAPFxx. If so, the library containing FDR must be listed in IEAAPFxx even if it is in the LINKLIST.

# 90.06 INSTALLING AND PRINTING THE USER DOCUMENTATION

File five of the installation tape contains IEBCOPY input which will create a documentation library. This library supplies the user with a machine-readable version of the INNOVATION FDR/CPK/ABR user documentation.

**LIBRARY CONTENTS** The documentation library, when loaded, will contain five members corresponding to the documentation sections and product components listed below.

MEMBER	SECTIONS	COMPONENT
FDR	1,10,20,21,25,26,30	FDR, DSF, FDRCOPY, FDRREORG, SAR *
CPK	40	COMPAKTOR
ABR	50-56	AUTOMATIC BACKUP & RECOVERY
MESSAGES	80	MESSAGES & CODES
INSTALL	90,91,92	INSTALLATION & OPTIONS

\*Includes Table of Contents and Introduction

**DISK SPACE REQUIREMENTS** The user documentation must be loaded to a partitioned data set on disk. You may load it to an existing data set (if it has sufficient space and proper DCB attributes) or allocate and load a new one. The following table shows the allocation parameters for the documentation library:

					PDS DIR
DATA SET	RECFM	LRECL	BLKSIZE	BLOCKS	BLOCKS
IDP.DOCFDR52	FB	80	6160	2000	5

This data set is allocated in blocks so that the system will calculate the correct number of tracks for your device type. If your installation uses a different block size for this data set, you should adjust the number of blocks accordingly.

**INSTALLATION INSTRUCTIONS** Execute the following JCL to load the user documentation. The following changes must be made to reflect your environment:

- 'DSN=IDP.DOCFDR52' on the SYSUT2 DD statement may be changed to the name of the library you wish to create for the documentation library.
- 'VOL=SER=vvvvvv' on the SYSUT2 DD statement must specify a disk volume where the documentation library will be allocated, or may be omitted if the data set will be SMS-managed.
- 'UNIT=TAPE' on the SYSUT1 DD statement must specify a tape drive capable of reading the installation tape that you have received (reel or cartridge).
- 'VOL=SER=FDR52T' on the SYSUT1 DD statement must be changed to 'VOL=SER=FDR52P' if you are loading from a production installation tape.

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**JOB CONTROL  
FOR LOADING  
LIBRARY**

The JCL below is supplied on the Installation Control Library (See Section 90.02) with a member name of 'DOCLOAD'. The JCL in the Installation Control Library reflects the type of product installation tape from which it was loaded.

```
//DOCLOAD      EXEC      PGM=I EBCOPY, REGI ON=1024K
//SYSPRI NT    DD        SYSOUT=*                      SEE NOTE 1
//SYSUT2       DD        DSN=I DP. DOCFDR52,            <- - USER-CHANGE
//              VOL=SER=vvvvvvv,                      <- - USER-CHANGE
//              SPACE=( 6160, ( 2000, 25, 5) , , , ROUND) ,    SEE NOTE 2
//              DCB=( BLKSI ZE=6160, LRECL=80, RECFM=FB) ,
//              UNI T=SYSDA, DI SP=( , CATLG, DELETE)
//SYSUT1       DD        DSN=DOC,
//              UNI T=TAPE,                            <- - USER-CHANGE
//              DI SP=OLD, LABEL=( 3, EXPDT=98000) ,
//              VOL=SER=FDR52T  CHANGE T TO P I F PRODUCTI ON TAPE
//SYSI N       DD*
               COPY OUTDD=SYSUT2, I NDD=( ( SYSUT1, R) )
```

NOTE 1: To load the documentation members to an existing library, replace SYSUT2 above with:

```
//SYSUT2       DD        DI SP=OLD, DSN=I DP. DOCFDR52  <- - USER-CHANGE
```

**BROWSING  
THE  
DOCUMENT**

Once loaded, the library may be browsed online using ISPF BROWSE or any comparable online browse function under TSO or any other online system.

**PRINTING THE  
DOCUMENT**

The documentation library contains upper and lower case characters and standardly available special characters. Most printers and terminals that do not support lower case will print or display the lower case characters in upper case instead. The documentation will never contain more than 80 characters on a line, and can be printed on narrow (8.5 x 11 inch) paper if standard 10 character/ inch spacing is used. Sufficient margin is allowed on the left to 3-hole punch the documentation after printing (or to use pre-punched narrow paper), but you must align the printer so that print column 80 is printed at the right edge of the 8.5 x 11 form.

Execute the following JCL procedure to print the entire document (Sections may be deleted by omitting the appropriate PRINT statement, enabling you to print a document customized to your needs). The following changes must be made to reflect your environment:

- A) 'DSN=IDP.DOCFDR52' on the SYSUT1 DD statement must be changed to the name of the library into which you loaded the documentation.
- B) Make any required changes to the SYSUT2 DD statement for special SYSOUT class, special forms, multiple copies, character sets, etc., as required by your installation.

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**JOB CONTROL  
FOR PRINTING  
DOCUMENT**

The JCL below is supplied on the Installation Control Library ([See Section 90.02](#)) with a member name of 'DOCPRINT'. The program FDRDOCPR is supplied in the FDR program library.

```
//I DPPRI NT      EXEC      PGM=FDRDOCPR
//SYSPRI NT      DD          SYSOUT=*
//SYSUT1         DD          DI SP=SHR, DSN=I DP. DOCFDR52<-- USER-CHANGE
//SYSUT2         DD          SYSOUT=*              <-- USER-CHANGE
//SYSI N         DD          *
***
***      TO PRI NT THE ENTI RE DOCUMENT
***      USE ALL OF THE PRI NT STATEMENTS SUPPLI ED
***
PRI NT      MEMBER=FDR
PRI NT      MEMBER=CPK
PRI NT      MEMBER=ABR
PRI NT      MEMBER=MESSAGES
PRI NT      MEMBER=I NSTALL
PRI NT      MEMBER=FDRCHSM
```

**THESE SECTIONS AVAILABLE IN MACHINE-READABLE VERSION OF THE MANUAL**

**90.11 INSTALLING MVS SCRATCH EXIT**

**90.12 INSTALLING MVS DATA SET NOT FOUND EXIT**

**90.12B INSTALLING MVS CATALOG LOCATE EXIT**

**90.13 INSTALLING TSO CLISTS AND HELP FOR ABR**

**90.14 INSTALLING ABR SCRATCH EXIT FOR NON-MVS**

**90.15 INSTALLING SU60 OPEN EXIT FOR NON-MVS**

**90.17 CREATING THE OS/CVOL CATALOG WITH ABR**

**90.18 CREATING THE ABR OS/CVOL CATALOG WITH SYSTEM UTILITIES**

**91.10 OPTIONAL USER SECURITY EXITS**

**91.11 PARAMETER LIST FOR SECURITY EXITS**

The above sections are available only in the machine-readable version of the manual. You may browse them in member INSTALL of the documentation library ([See Section 90.06](#)), or you may print them.

Note concerning Sections 90.11, 90.12, and 90.12B:

**INNOVATION strongly recommends that you use the dynamic installation procedure for the ABR Operating System exits, as described starting in [Section 92.50](#), instead of the SMP installation procedure described in Sections 90.11, 90.12, and 90.12B.**

**90.12A INSTALLING ICF VSAM MOD FOR UPDATE/LAST REFERENCE DATE**

ABR supports incremental backup of ICF VSAM data sets using the Update Indicator in the Format 1 DSCB, and ABR supports ARCHIVE and SUPERSCRATCH of ICF VSAM data sets using the Last Reference Date in the Format 1 DSCB. For ICF VSAM, the recording of the Update Indicator and Last Reference Date are optional, and the default is that they are not recorded. If you wish to use this feature of ABR, you must (1) tell the Operating System to maintain the update indicator and Last Reference Date, and (2) tell ABR.

**If ABR is running on a system with DFP V3 or higher installed, this MOD is not needed.**

**MODIFICATION  
DESCRIPTION**

ICF VSAM provides a standard exit module named IDATMSTP that the installation can modify to tell the Operating System to maintain the Update Indicator and Last Reference Date for VSAM data sets cataloged in ICF catalogs. In systems with MXS/XA DFP2.3 or higher, IDATMSTP is a separate load module in SYS1.LPALIB; in systems at lower levels, IDATMSTP is a CSECT of load module IDA0192A in SYS1.LPALIB.

**DFHSM  
CONSIDERATION**

If HSM or DFHSM is installed in your system, then do not install this USERMOD. (DF)HSM supplies an IDATMSTP module that performs exactly the same function of telling the Operating System to maintain the Update Indicator and Last Reference Date for ICF VSAM.

**INSTALLING  
THE  
MODIFICATION**

You can develop the code yourself to modify or replace IDATMSTP, or you can install the following modification supplied by INNOVATION. You can install the modification by using the ISPF panel FDR INSTALLATION -- INSTALL THE ABR OPERATING SYSTEM EXITS (option A.I.13), and selecting option 3, ICF VSAM MOD TO SET THE UPDATE INDICATOR AND LAST REFERENCE DATE: or you can use SMP directly. This modification is also supplied in members LFD2ICF (for systems with MVS/XA DFP 2.3 or higher) and LFD1ICF (for systems at lower levels than MVS/XA DFP 2.3) of the Installation Control Library (90.02).

USERMOD LFD2ICF, for systems with MVS/XA DFP 2.3 or higher.

```

++USERMOD      LFD2I CF)
++VER          ( ZO38)          FMI D          ( HDP2230)
++ZAP          ( I DATMSTP) .
NAME           I DATMSTP
VER            0026 90EC, DOOC, O5CO
REP            0026 41FO, 0004, O7FE

```

USERMOD LFD1ICF, for systems at lower levels than MVS/XA DFP 2.3. In the ++VER Statement, use only the FMID that applies to your system.

```

++USERMOD      ( LFD1I CF)
++VER          ( ZO38)          FMI D          ( JDM1113) or ( HDP1102)
or             ( HDP2210)      or             ( HDQ1102)
++ZAP          I DATMSTP)
NAME           I DATMSTP
VER            0016 90EC, DOOC, O5CO
REP            0016 41FO, 0004, O7FE

```

You must re-IPL and do a CLPA for the modification to take effect.

**TELLING ABR**

To notify ABR that the Update Indicator and Last Reference Date are being maintained for ICF VSAM data sets, set the ICFSU60 option to YES on the ISPF panel FDR INSTALLATION --SET FDR GLOBAL OPTIONS FOR ABR (option A.I.4.4), or run program FDRZAPOP with the command ZAP ENABLE=ICFSU60. [See Section 91](#) for details.

ABR will assume ICFSU60 if running on a system with DFPV3 or higher installed.

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## 90.12A CONTINUED . . .

**LIMITATIONS** The support provided by IDATMSTP is incomplete. Even with the modification installed, the update indicator and Last Reference Date are only maintained for the first volume of the data component of non-key range VSAM clusters. The Operating System provides no facility for maintaining these fields for index components, or for data components of alternate indexes, or for any component if a cluster has key ranges, or for volumes after the first if a data component is on more than one volume.

ABR treats as a unit, all components of the base cluster and alternate indexes, if any, that are on one volume. Therefore, for clusters that do not have key ranges, the Update Indicator and Last Reference Date in the base data component suffice to control processing of all components on the volume. ([See Section 52.11, Multi-Volume Warnings.](#))

Another limitation of the support provided by IDATMSTP is that the Last Reference Date is not set to the date of an OPEN, if the date was previously zero. Since the Last Reference Date starts out as zero when a cluster is DEFINed, it is a user responsibility to initialize the date to a non-zero value. Under ABR this happens in two ways:

1. For data sets that exist on a volume and have a Last Reference Date of zero when the ABR disk volume processing options are set (using the ISPF panel FDR INSTALLATION -- SET ABR DISK VOLUME PROCESSING OPTIONS(option A.1.8), or using directly the ABRINIT command of program FDRABRM(90.24), the Last Reference Date is set to the date of the run.
2. For data sets that are created subsequently, program FDRABR sets the Last Reference Date to the date of the run, the first time a data set is dumped, either incrementally or as part of a full-volume backup, if the Last Reference Date was previously zero.

If you do not run backups every day, and you want precise recording of Last Reference Dates, then each day you can set the Last Reference Date to that day for any data set that has a Last Reference Date of zero, by using the CSLREF option of the ISPF panel FDR INSTALLATION -- SET ABR DISK VOLUME PROCESSING OPTIONS (option A.1.8), or by running directly program FDRABRM with the command MAINT VOL(G)=vvvvvv,CSLREF ([Section 55.04](#)).



**90.16 ABR CATALOG REQUIREMENTS**

**WHY A CATALOG** ABR uses the catalog management routines of the Operating System to store pointers to the tapes created while performing user requested functions, and if the SCRATCH exit (Section 90.11 or 90.14) is installed, to record information concerning data sets that have been SCRATCHed after having been backed up through ABR. ABR catalog entries may be placed in any active catalog.

**CREATING THE CATALOG** INNOVATION strongly recommends that the ABR catalog be a separate catalog from other catalogs at your installation, so that ABR will be isolated from other functions and vice versa.

You can create the ABR catalog by using the ISPF panel FDR INSTALLATION – CREATE THE ABR CATALOG (option A.I.7).

**ICF VSAM SPACE REQUIREMENTS** At most installations, an allocation of five primary cylinders and two secondary for the ABR ICF VSAM catalog will be ample. A test catalog was created on a 3350 and 4700 records filled five cylinders of primary space using the JCL example in [Section 90.19](#). Those who want to estimate the space requirement more precisely may use the IBM reference manual 'Catalog Administration Guide' section titled 'Estimating the ICF Catalog's Space Requirements' and information below to determine the size of the catalog.

**CATALOG CONTENTS** The ABR catalog contains three types of entries: Backup, Scratch, and Archive.

**BACKUP SECTION** The backup section of the ABR catalog contains an entry for every full-volume, incremental, and selective backup file created by ABR (files created by running FDRABR with DUMP TYPE=FDR, AUTO, ABR or DSF -- [Section 50](#)). These entries are automatically deleted by ABR after n generations, where n is the value set for GEN= by the ABRINIT command ([Section 90.24](#)).

**SCRATCH SECTION** The scratch section of the ABR catalog contains an entry for every direct-access data set that was scratched after having been backed up through ABR. These entries are only created if the ABR pre-processing exit is installed. The pre-processing exit prefixes a high-level index of '#' to the name of the data set being scratched, and catalogs the resulting name in the ABR catalog. These entries identify the backup file to be used if a user requests ABR to RESTORE a scratched data set. The PURGE SCRATCH command of program FDRABRCM ([Section 55.22](#)) will delete these entries when the backup files with which they are associated are no longer in the catalog. This function should be run periodically to keep the catalog from filling up.

**ARCHIVE SECTION** The archive section of the ABR catalog contains entries for selected ARCHIVE files (files created by running FDRABR with DUMP TYPE=ARC -- [Section 51](#)). Each ARCHIVE run creates catalog entries only for the first files created in that run and for any file that starts a new reel of tape. If disk is used as the backup medium, each file will get cataloged. ABR never uses these catalog entries; they are provided for installations that manage the retention of tapes through a tape management system with catalog control. The REORG command of program FDRARCH ([Section 55.14](#)) removes these entries when the reorganization process finds that the archive tape has expired.

**90.19 CREATING THE ABR ICF VSAM CATALOG**

**NEW USERS** IDCAMS must be used to DEFINE the ABR ICF VSAM catalog and connect this catalog to the master catalog. The following Job Control Language and IDCAMS control statements may be used to DEFINE the ABR user catalog:

```
//DEFINE      EXEC          PGM=IDCAMS
//SYSPRI NT   DD            SYSOUT=*
//SYSI        DD            *
      DEFINE    USERCATALOG( --
                  NAME(CATALOG. ABRBASE) --
                  CYLINDERS(5 2)          --
                  ICFCATALOG              /* ICF only */--
                  FREESPACE(10 20)        /* ICF only */--
                  VOLUME(vvvvvv) )
```

NOTE 1: 'vvvvv' is the volume serial number of the disk that will contain the ABR ICF VSAM catalog.

NOTE 2: If you wish to use a VSAM user catalog remove the entries with the comment 'ICF ONLY' from the DEFINE command.

**ALL USERS** The following JCL and IDCAMS control statements may be used to connect the ALIASes for the ABR user catalog:

```
//CONNECT      EXEC          PGM=IDCAMS
//SYSPRI NT   DD            SYSOUT=*
//SYSI N       DD            *
      DELETE    (FDRABR, #) ALIAS
      DEFINE    ALIAS( NAME(FDRABR) RELATE(CATALOG. ABRBASE) )
      DEFINE    ALIAS( NAME(#) RELATE(CATALOG. ABRBASE) )
/*
```

**MULTIPLE CPUS** In an installation where more than one processing unit (CPU) will be using AUTOMATIC BACKUP & RECOVERY, run the step below on each of the systems except the one where you ran the DEFINE USERCATALOG.

```
//CONNECT      EXEC          PGM=IDCAMS
//SYSPRI NT   DD            SYSOUT=*
//SYSI N       DD            *
      DELETE    (FDRABR, #) ALIAS
      I MPORT    OBJECTS(          --
                  (CATALOG. ABRBASE --
                  VOLUME(vvvvvv)   --
                  DEVI CETYPE(uni tname) ) ) --
      CONNECT
      DEFINE    ALIAS( NAME(FDRABR)
RELATE(CATALOG. ABRBASE) )
      DEFINE    ALIAS( NAME(#) RELATE(CATALOG. ABRBASE) )
/*
```

**90.20 SETTING ABR DISK VOLUME PROCESSING OPTIONS**

**GENERAL** For any disk volume that is to be processed by AUTOMATIC BACKUP & RECOVERY, you must set certain disk volume processing options. In this manual, the process of setting the disk volume processing options is sometimes called "ABR initialization". You can set the disk volume processing options by using the ISPF panel FDR INSTALLATION -- SET ABR DISK VOLUME PROCESSING OPTIONS (option A.I.8). Or, you can execute program FDRABRM directly as shown in the following Sections. The process of setting the disk volume processing options writes a model Format 1 DSCB (i.e.: a DSCB for a data set with zero tracks) into the VTOC of the volume. This model DSCB contains ABR control information and the user-specified processing options. In addition, the process of setting the disk volume processing options can set user-specified options in the Format 1 DSCB for any data set on the volume, indicating when or how ABR is to process the data set.

If you want to change the disk volume processing options for a volume after they have initially been set, refer to the description of the VTOC maintenance utility in [Section 55](#).

The data set name for the ABR model DSCB is FDRABR.Vvolser. If the installation has programs other than ABR that SCRATCH data sets automatically, the programs must be changed to exclude the ABR data sets before ABR can be used.

ABR disk volume processing options can be set either on a new volume that has just been initialized by ICKDSF, or on an existing volume that contains any number of data sets. "ABR initialization" does not affect normal use of the volume.

**DSCB FIELDS** ABR uses the Update Indicator and the Last Reference Date set by the MVS system.

When program FDRABRM sets the disk volume processing options for use by ABR, it sets that Last Reference Date to the date of the run for any data set that previously had a Last Reference Date of zero. (For data sets that are created subsequently, the ABR DADSM Pre-processing exit ([Section 92.60](#)) sets the Last Reference Date to the creation date when the data set is created. If the ABR DADSM Pre-processing exit is not installed, then program FDRABR sets the Last Reference Date of zero to the run date the first time a data set is dumped, either incrementally or as part of a full-volume backup.)

ABR uses, in addition to the Update Indicator and the Last Reference date, two (2) additional bytes within each Format 1 DSCB. These bytes, relative bytes 103 and 104, were formerly reserved.

**CAUTION:** If you currently have a means of indicating Update or Last Date Referenced, that does not use the same fields as the MVS system, contact INNOVATION for further instructions.  
SETTING THE ABR DISK VOLUME PROCESSING OPTIONS SHOULD NOT BE  
ATTEMPTED UNTIL ANY REQUIRED MODIFICATIONS ARE IN PLACE.

**FDRABRM** The ABR disk volume processing options are set by the utility program, FDRABRM. FDRABRM will create the model Format 1 DSCB and mark all existing Format 1 DSCBs for the type of ABR processing necessary. The next several sections describe the Job Control statements and processing commands required to set the ABR disk volume processing options for the volumes you wish ABR to manage.

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## 90.20 CONTINUED . . .

**SMS CONSIDERATIONS**

The ABRINIT command supports the creation of ABR model DSCBs on volumes managed by SMS (System Managed Storage; [See Section 52.50](#)). The following rules and considerations apply:

- If any volume to be processed by ABR is SMS-managed, then the ABR catalog must be an ICF catalog ([Section 90.19](#)). The reason is that all data sets on an SMS-managed volume must be cataloged in an ICF catalog, including the ABR model DSCB.
- The SMS ACS routines will not determine the volume on which the ABR model DSCB is allocated. The volumes on which ABR model DSCBs are created will be selected by the ABRINIT command based on the VOL, VOLG, and ONLINE operands and DISKxxxx DD statements. If a selected volume is SMS-managed, then a storage class must be assigned, or the creation will fail; a data class and/or a management class may optionally be assigned also. Details follow. If a selected volume is not SMS-managed, then any assigned SMS classes will be ignored.
- The ABR model DSCB on an SMS-managed volume must have a storage class assigned.
  - The installation may set up its ACS routine to assign an appropriate storage class to ABR model DSCBs (data sets named FDRABR.Vxxxxxx with zero space). In this case, no special operands are needed on the ABRINIT command.
  - If the ACS routine does not automatically assign a storage class, then a storage class must be assigned by the STORCLAS operand of the ABRINIT command.
  - The installation's ACS routine may accept the requested storage class, or may change it to a different storage class. In these cases the ABR model DSCB will be successfully created.
  - The installation's ACS routine may reject the requested storage class, i.e. may indicate that this data set should not be SMS-managed. In this case BYPASSACS must be specified on the ABRINIT command to allow the ABR model DSCB to be created.
- The ABR model DSCB on an SMS-managed volume may optionally have a data class assigned. The data class may be assigned only by the DATACLAS operand; the data class ACS routine is not given control. The data class has no effect on the processing of the ABR model DSCB; if specified, it is used only for documentation or reporting.
- The ABR model DSCB on an SMS-managed volume may optionally have a management class assigned. The management class may be assigned automatically by the ACS routine, or explicitly by the MGMTCLAS operand (unless overridden by the ACS routine). The specifications in the SMS definition for the management class will not be used by ABR for managing the ABR model DSCB; the ABR model DSCB will be backed up on every incremental backup, and will never be ARCHIVED. However, if other DASD management software that looks at the management class runs on this volume, the management class may be significant.

**90.21 JOB CONTROL REQUIREMENTS FOR SETTING DISK PROCESSING OPTIONS**

The following Job Control statements are necessary to set the ABR disk volume processing options:

**JOB STATEMENT** The JOB statement is user-specified and depends upon installation standards.

**EXEC STATEMENT** Must specify the name of the program that sets the ABR disk volume processing options -- FDRABRM. It may also contain the region requirements of 256K.

**STEPLIB OR JOBLIB DD STATEMENT** If required, must specify the load module library in which ABR resides. This library must be authorized.

**SYSPRINT DD STATEMENT** Specifies the output message data set. This is a required DD statement and usually is a SYSOUT data set.

**ABRMAP DD STATEMENT** Specifies the VTOC/DSCB report data set. Usually a SYSOUT data set. If LIST=ALL or LIST=YES is specified and an ABRMAP DD statement is not present, the reports will be written to the SYSPRINT data set.

**SYSUDUMP DD STATEMENT** Specifies the ABEND dump data set. Although not required, we strongly urge you to always include this DD statement so we can help you diagnose your error conditions. This is usually a SYSOUT data set.

**DISKxxxx DD STATEMENT(s)** Optional. When executing on an MVS, XA, or ESA system and specifying the ONLINE or VOL/VOLG operands, DISKxxxx DD statements are not required, since the desired volumes will be dynamically allocated with a ddname of DISKONL1.

If used, DISKxxxx DD statements specify the DASD volumes to be processed by commands that do not specify ONLINE or VOL/VOLG. The first four (4) bytes of the ddname must be 'DISK', and the remaining one (1) to four (4) bytes may be any characters valid in a ddname (0-9, A-Z, \$, #, @). The DD statement should be specified as follows:

```
//DISKxxxx DD UNIT=unitname, VOL=SER=vvvvvvv, DISK=SHR
```

**SYSIN DD STATEMENT** Specifies the control statements data set. Usually an input stream or DD \* data set.

**90.22 COMMANDS TO SET ABR DISK VOLUME PROCESSING OPTIONS**

Three (3) commands control the process of setting the disk volume processing options. Each may appear as many times as required. The commands are:

**...DEFAULT** Establish DEFAULT criteria for those commands that follow.

**...ABRINIT** Set the disk volume processing options.

**...SELECT** Mark data set(s) for special ABR processing.

Each command will be discussed separately.

## 90.23 THE DEFAULT COMMAND

**DEFAULT DEF**      *CYCLE=nn | LIST=ALL / YES / NO  
                          ,FORCE | ,LOWTHRESHOLD=nnn  
                          ,GEN=nnnn | ,RESERVE=NO / YES  
                          ,HIGHTHRESHOLD=nnn | RETPD = nnnn*

**DEFAULT COMMAND**    The DEFAULT command is used to establish defaults for subsequent ABRINIT commands. It may appear many times within any control statement stream. For any keyword, only the most recent appearance on a DEFAULT command is in effect when subsequent commands are selected for processing.

**OPERANDS**    **CYCLE=**            Specifies the number of cycles that are to be created in each generation of backups for this volume at installations that execute program FDRABR with DUMP commands that specify TYPE=AUTO. (For a full explanation of cycles and generations, [See Section 52](#)).  
                          The number specifies must be between 0 and 63, inclusive.  
                          The default value is 10 unless modified in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**FORCE**                    Indicates that the disk volume processing options are to be set even if the reserved fields that the process will modify are not binary zero (0).

**GEN=**                     Specifies the number of generations of backups for this volume that ABR is to maintain in the catalog. At the beginning of a new generation, program FDRABR will uncatalog all the backup tapes from the nnnn'th prior generation, where nnnn was the value specified for GEN=. (For a full explanation of generations, [See Section 52](#)). The number specified must be between 1 and 1000, inclusive.  
                          The default value is 4 unless modified in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**HIGHTHRESHOLD=**       Specifies the high allocation percentage threshold that ABR is to store in the ABR model DSCB. It may optionally be used to bypass ARCHIVE and SUPERSCRATCH on volumes which are below this threshold (For an explanation of threshold usage, [See Section 51](#)). The number specified must be between 0 and 100, inclusive.  
                          The default value is 80 unless modified in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**LIST=**                    **ALL** or **YES**—specifies that the ABRINIT command will print a VTOC listing showing all data sets on the volumes for which disk volume processing options have been set.  
                          **NO**— specifies that the ABRINIT command will not print a VTOC listing.  
                          The default is NO.

**LOWTHRESHOLD=**       Specifies the low allocation percentage threshold that ABR is to store in the ABR model DSCB. It may optionally be used to bypass ARCHIVE and SUPERSCRATCH on volumes which are below this threshold (For an explanation of threshold usage, [See Section 51](#)). The number specified must be between 0 and 100, inclusive.  
                          The default value is 50 unless modified in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**RESERVE=YES** specifies that ABR will issue a RESERVE command to insure VTOC integrity during the update operations.  
**NO** specifies that ABR will only issue an ENQ of the VTOC.  
                          The default is YES.

**RETPD=**                   Specifies the retention period, in days, for the full volume backup tape that begins each new generation of backups for this volume. All cycles within a generation will normally be set to expire on the same day as the full-volume backup. Retention periods can be overridden at execution time for program FDRABR. (For a full explanation of cycles, generations, and retention periods for backups, [See Section 52](#)). The number specified for RETPD must be between 1 and 9999, inclusive.  
                          The default value is 60 unless modified in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

## 90.24 THE ABRINIT COMMAND

**ABRINIT** / **ABR** | **BYPASSACS**,**LIST=ALL** / **YES** / **NO**  
**CYCLE=nn** | **,LOWTHRESHOLD=nnn**  
**,DATACLAS=classname** | **,MGMTCLAS=classname**  
**,DISABLE=(c...c,...,c...c)** | **,ONLINE**  
**,ENABLE=(c...c,...,c...c)** | **,RESERVE=NO** / **YES**  
**,FORCE** | **,RETPD=nnnn**  
**,GEN=nnnn** | **,STORCLAS=classname**  
**,HIGHTHRESHOLD=nnn** | **,VOL=vvvvvv** | **,VOLG=vvvvv**

**ABRINIT COMMAND** The ABRINIT command specifies the ABR disk volume processing options and the volumes for which they are to be set. If the ABRINIT command contains the VOL or VOLG operand, the options will be set on only the specified volume(s). If the ABRINIT command contains the ONLINE operand, the options will be set on all mounted volumes.

**ISPF DIALOG SUPPORT** Most of the functions of the ABRINIT command can be performed by using the ISPF panel FDR INSTALLATION—SET ABR DISK VOLUME PROCESSING OPTIONS (option A.I.8).

**OPERANDS** **BYPASSACS** On a system with SMS (System Managed Storage) active, specifies that the SMS ACS (Automatic Class Selection) routines are not to be invoked when allocating the ABR model DSCB. The SMS classes specified by the DATACLAS, MGMTCLAS, and STORCLAS operands will be assigned (if the volume on which the ABR model DSCB is being created is SMS-managed). BYPASSACS must be specified if the installation's ACS routines do not permit a storage class to be assigned to an ABR model DSCB on an SMS-managed volume. See "SMS Considerations" in [Section 90.20](#), and [See Section 52.50](#).

Since BYPASSACS bypasses normal SMS allocation controls and rules, the user running the ABRINIT job must be authorized to the RACF profile STGADMIN.ADR.RESTORE.BYPASSACS in class FACILITY, or the equivalent in other security systems.

The default is that the SMS ACS routines will be invoked for the ABR model DSCB. The SMS classes, if any, specified by the MGMTCLAS and STORCLAS operands will be passed to the ACS routines, which may accept, change, or nullify them.

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## 90.24 CONTINUED . . .

**CYCLE=** Specifies the number of cycles that are to be created in each generation of backups for this volume at installations that execute program FDRABR with DUMP Commands that specify TYPE=AUTO. (For a full explanation of Cycles and Generations, [See Section 52](#)). The number specified must be between 0 and 63, inclusive.

The default is 10 unless overridden by a preceding DEFAULT command or by a change in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**DATACLAS=** Specifies the SMS data class to be associated with ABR model DSCBs that are created on SMS-managed volumes by this ABRINIT command. The data class has no effect on the processing of the ABR model DSCB; if specified, it is used only for documentation or reporting.

The default is that no data class will be associated with the ABR model DSCBs.

**DISABLE=** Specifies the option(s) coded for this operand will be disabled for ABR processing. See the ENABLE Operand for the available option(s).

**ENABLE=** Specifies the option(s) for this operand will be activated for ABR processing. The options are:

**ARCHIVE**—sets the indicator on this volume to permit data set ARCHIVING. If the program FDRABR is executed against this volume with a DUMP Command that specifies TYPE=ARC, the volume will be processed.

Default is that the volume is enabled for ARCHIVE.

**OLDBKUP**—sets the indicator on this volume to permit tabling of previous backup cycles (OLDBACKUP). If the program FDRABR is executed against this volume with a DUMP TYPE=ABR, TYPE=DSF, TYPE=FDR or TYPE=AUTO, the previous backup cycles will be recorded.

Default is that the OLDBACKUP information will not be recorded.

NOTE: The location within the DSCB of the cycle table as well as the maximum number of cycle table entries is specified stored in the FDR/ABR Global Option Table ([See Section 91 or 92](#)).

**SCRATCH**—Sets the indicator on this volume to permit SUPERSCRATCH (TYPE=SCR). If the program FDRABR is executed against this volume with a DUMP Command that specifies TYPE=SCR, the volume will be processed.

Default is that the volume is disabled for SUPERSCRATCH.

**FORCE** Indicates that the disk volume processing options are to be set even if the reserved fields that the process will modify are not binary zero (0).

The default is the disk volume processing options will not be set unless FORCE was specified on any DEFAULT command.

**GEN=** Specifies the number of generations of backups for this volume that ABR is to maintain in the catalog. At the beginning of a new generation, program FDRABR will uncatalog all the backup tapes from the nnnn'th prior generation, where nnnn was the value specified for GEN=. (For a full explanation of generations, [See Section 52](#)). The number specified must be between 1 and 1000, inclusive.

The default is 4 unless overridden by a preceding DEFAULT command or by a change in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

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## 90.24 CONTINUED . . .

**HIGHTHRESHOLD=** Specifies the high allocation percentage threshold that ABR is to store in the ABR model DSCB. It may optionally be used to bypass ARCHIVE and SUPERSCRATCH on volumes which are below this threshold (For an explanation of threshold usage, [See Section 51](#)). The number specified must be between 0 and 100, inclusive.

The default is 80 unless overridden by a preceding DEFAULT command or by a change in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**LIST=** **ALL** or **YES**—specifies that the ABRINIT command will print a VTOC listing showing all data sets on the volumes for which disk volume processing options have been set.

**NO**—specifies that the ABRINIT command will not print a VTOC listing.

The default is NO unless overridden by a preceding DEFAULT command.

**LOWTHRESHOLD=** Specifies the low allocation percentage threshold that ABR is to store in the ABR model DSCB. It may optionally be used to bypass ARCHIVE and SUPERSCRATCH on volumes which are below this threshold (For an explanation of threshold usage, [See Section 51](#)). The number specified must be between 0 and 100, inclusive.

The default is 50 unless overridden by a preceding DEFAULT command or by a change in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**MGMTCLAS=** Specifies the SMS management class to be associated with ABR model DSCBs that are created on SMS-managed volumes by this ABRINIT command. The ACS routine may accept, change, or nullify this class, unless BYPASSACS is specified. The specifications in the SMS definition for the management class will not be used by ABR for managing the ABR model DSCB; the ABR model DSCB will be backed up on every incremental backup, and will never be ARCHIVED. However, if other DASD management software that looks at the management class runs on this volume, the management class may be significant.

The default is that no management class will be associated with the ABR model DSCBs, unless one is assigned by the ACS routine.

**ONLINE** Specifies that the ABR disk volume processing options on this ABRINIT command are to be set for all volumes that are online to the system, except those volumes referenced by another ABRINIT command in this run containing VOL or VOLG.

If ONLINE is specified on a command that also specifies VOL or VOLG, then ONLINE is ignored.

The default, if neither ONLINE nor VOL nor VOLG are specified, is that the ABR disk volume processing options on this ABRINIT command will be set for all volumes specified on DISKxxxx DD statements, except those volumes referenced by another ABRINIT command in this run containing VOL or VOLG.

**RESERVE=** **YES**—specifies that ABR will issue a RESERVE Command to insure VTOC integrity during update operations.

**NO**—specifies that only an enqueue of the VTOC is issued.

Default is YES.

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## 90.24 CONTINUED . . .

**RETPD=** Specifies the retention period, in days, for the full-volume backup tape that begins each new generation of backups for this volume. All cycles within a generation will normally be set to expire on the same day as the full-volume backup. Retention periods can be overridden at execution time for program FDRABR. (For a full explanation of CYCLES, GENERATION, and RETENTION PERIODS for BACKUPS, [See Section 52](#)). The number specified for RETPD must be between 1 and 9999, inclusive.

The default is 60 unless overridden by a preceding DEFAULT command or by a change in the FDR/ABR Global Option Table ([See Sections 91 or 92](#)).

**STORCLAS=** Specifies the SMS storage class to be associated with ABR model DSCBs that are created on SMS-managed volumes by this ABRINIT command. The ACS routine may accept, change, or nullify this class, unless BYPASSACS is specified. However, if no storage class is assigned for an ABR model DSCB to be created on an SMS-managed volume, the creation will fail. See "SMS Considerations" in [Section 90.20](#).

The default is that no storage class will be associated with the ABR model DSCBs, unless one is assigned by the ACS routine.

**VOL=** Specifies the serial number of the disk volume for which the ABR disk volume processing options on this ABRINIT command will be set. This operand will accept only a single volume serial; it will not accept a list enclosed in parentheses, or a volume group indicated by placing an asterisk at the end of a prefix.

**VOLG=** Specifies a group of volume serial numbers. The ABR disk volume processing options on this ABRINIT command will be set for any disk volume that is online to the system and that has a serial number starting with the 1 to 5 characters specified.

NOTE: VOL and VOLG are mutually exclusive. One and only one of these operands may be specified.

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## 90.25 THE SELECT COMMAND

*SELECT / S**DSN = (dsname,...,dsname) | DSG = (dsgroup,...,dsgroup)**,OPTIONS = options**,VOL = vvvvvv***SELECT  
COMMAND**

The SELECT Command is used to indicate special ABR processing for data sets or data set groups.

**OPERANDS****DSN=**

Specifies string(s) from 1 to 44 characters in length. All data sets having a name that matches the selection criteria (i.e.: compare length is 44) are marked with the ABR options indicated.

Default is the SELECT Command will be marked in error if neither DSN or DSG is specified. DSN and DSG operands may be repeated and/or intermixed.

**DSG=**

Specifies string(s) from 1 to 44 characters in length. All data sets having a name that matches the selection criteria (i.e.: compare length is the length of data specified) marked with the ABR options indicated.

Default is the SELECT Command will be marked in error if neither DSN or DSG is specified. DSN and DSG operands may be repeated and/or intermixed.

**OPTIONS=**

Specifies the special ABR options that are in effect for all matching data sets. The available options are:

**AD**—Always backup this data set on TYPE=ABR, but never ARCHIVE it.

**EX**—Exclude from all ABR processing except full-volume backups.

**ND**—Normal backup, never ARCHIVE it.

The default is that the special processing indicators are not set.

NOTE: This option only affects existing data sets. A user can also exclude data set(s) from ARCHIVE or BACKUP by using the ABR PROTECT list.

**VOL=**

Specifies the serial number of the disk volume on which to search for the data set(s) or data set group(s).

The default is all volumes referenced by DISKxxxx DD Statements or by any ABRINIT command will be searched.

**RECOMMENDATION: INNOVATION strongly recommends using the ABR PROTECT LIST for this function.**

**90.26 EXAMPLES OF SETTING DISK VOLUME PROCESSING OPTIONS**

**NOTE:** You can use the ISPF Dialogs A.I.8 to enable these options also.

**EXAMPLE 1** Set the ABR disk volume processing options for all volumes that are online to the system, enabling all ABR features. Use the defaults of CYCLE=10, RETPD=60, GEN=4, LOWTHRESHOLD=50, HIGHTHRESHOLD=80 unless these have been overridden in the FDR/ABR Global Option Table. Do not print the VTOCs.

```
//I NI TVOLS EXEC PGM=FDRABRM, REGI ON=256K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSI N DD *
ABRI NI T ONLI NE, ENABLE=(OLDBKUP, SCRATCH)
```

**EXAMPLE 2** Set the ABR disk volume processing options for volume SYSRES with GEN=12, RETPD=90 and with ARCHIVE disabled. Set the disk volume processing options for all other volumes that are online to the system with GEN=4, RETPD=30 and ARCHIVE enabled. All volumes will have OLDBKUP enabled. Low and high allocation percentage thresholds of 40 and 75 will be set on all volumes. The reserved fields may not be binary zeroes but the disk volume processing options must be set. Print all of the VTOCs.

```
//I NI T EXEC PGM=FDRABRM, REGI ON=256K
//SYSPRI NT DD SYSOUT=*
//ABRMAP DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSI N DD *
DEFAULT FORCE, LI ST=ALL, LOWTHRESHOLD=40, HI GHTHRESHOLD=75
ABRI NI T VOL=SYSRES, GEN=12, RETPD=90, DI SABLE=ARCHI VE, EN-
ABLE=OLDBKUP
ABRI NI T ONLI NE, RETPD=30, ENABLE=OLDBKUP
```

**EXAMPLE 3** Set the ABR disk volume processing options for all of the TEST volumes with SUPERSCRATCH (TYPE=SCR) enabled. These volumes are SMS-managed, so it is necessary to specify a storage class for the ABR model DSCB. Set the ABR disk volume processing options for all of the PROD volumes with SUPERSCRATCH disabled. These volumes are also SMS-managed. All volumes should have OLDBKUP enabled. Do not print the VTOCs.

```
//STEP1 EXEC PGM=FDRABRM, REGI ON=256K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSI N DD *
ABRI NI T VOLG=TEST, ENABLE=(SCRATCH, OLDBKUP), STORCLAS=SCTEST
ABRI NI T VOLG=PROD, ENABLE=OLDBKUP, STORCLAS=SCPROD
```

**EXAMPLE 4** Set the ABR disk volume processing options for all volumes that are online to the system, enabling all ABR features. Use the defaults for CYCLE, RETPD, GEN and LOWTHRESHOLD, but set HIGHTHRESHOLD to 90. Do not print the VTOCs. Many of the volumes are SMS-managed, so it is necessary to specify a storage class for the ABR model DSCBs. The storage class will be ignored for any volumes that are non-SMS. The SMS ACS routines at this installation would not allow a data set with a name like that of the ABR model DSCB to be placed on an SMS-managed volume, so it is necessary to specify BYPASSACS. The specified storage class name does not have to be the name of an actual storage class.

```
//STEP1 EXEC PGM=FDRABRM, REGI ON=256K
//SYSPRI NT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSI N DD *
ABRI NI T ONLI NE, ENABLE=(OLDBKUP, SCRATCH), HI GHTHRESHOLD=90,
STORCLAS=ABRMODEL, BYPASSACS
```

**90.27 ARCHIVE CONTROL FILE REQUIREMENTS**

**WHY THE  
ARCHIVE  
CONTROL FILE**

ABR, executing the ARCHIVE option, has the ability to BACKUP, SCRATCH, and UNCATALOG data sets that match user selection criteria. When a data set is removed from the disk volumes, ABR must note the volume it came from, where the backup files were created, the DCB attributes, and the space the data set occupied. ABR uses the ARCHIVE Control File to contain pointers to the ARCHIVED data sets.

The ARCHIVE Control File must reside on a disk volume and is normally named "FDRABR.ARCHIVE\9, although you can change this name. The name of the ARCHIVE Control File must include an index level starting with 'ARCHIVE' as any level other than the high-level index. The remaining characters are up to the discretion of the user.

There may be many Archive Control Files in an installation. Generally there is one common ARCHIVE Control File for normal ARCHIVING and AUTO-RECALL; if ARCHIVING or AUTO-RECALL are done from more than one CPU in an installation, this Control File should be shared across all the CPUs. However, there may be other ARCHIVE Control Files for special purposes.

**AUTO RECALL  
AND  
DYNAMIC  
ALLOCATION**

The FDR/ABR Global Option table contains the name of the ARCHIVE Control File which will be dynamically allocated by the DYNARC option during ARCHIVE dumps and restores. This ARCHIVE Control File name is used for AUTO-RECALL by the Catalog Locate Exit and Data Set Not Found Exit, by the ABR ISPF panels, and by any ARCHIVE DUMP or RESTORE which specifies DYNARC. Since there can only be one such file named, one common ARCHIVE Control File should be used for all normal ARCHIVED data sets including those set up for AUTO-RECALL (the RECALL option on DUMP statements).

The default name is FDRABR.ARCHIVE. The default can be changed in the Global Option table by FDRZAPOP ([See Section 91](#)) or the ABR ISPF panels ([See Section 92](#)).

**APPLICATION  
BACKUP**

One use of ARCHIVE which requires separate ARCHIVE Control Files is application backup, a function for creating special backups of application-oriented data sets with DUMP TYPE=ARC,SCRATCH=NO. This is described in detail in [Section 52.08](#). A temporary ARCHIVE Control File is usually initialized every time the application backup is run.

The option USERINDEX=YES shown in [Section 90.29](#) will format the special ARCHIVE Control File so that ABR will create tape backup files with the same high-level index as the ARCHIVE Control File itself has, so that the backup datasets created can be more easily associated with the application they belong to. This option should be used ONLY when initializing Control Files for application backup with SCRATCH=NO.

**ARCHIVE  
CONTROL FILE  
ALLOCATION**

ABR supplies a utility program, FDRARCH, which will initialize the ARCHIVE Control File. You can create the ARCHIVE Control File by using the ISPF panel FDR INSTALLATION -- ABR ARCHIVE FILE INITIALIZATION (option A.I.9). Or, you can execute FDRARCH directly as shown in the following Sections. Approximate space requirements for the ARCHIVE Control File at default blocking are as follows:

...3350—116 DATA SETS/TRACK  
...3380—292 DATA SETS/TRACK  
...3390—348 DATA SETS/TRACK

The above applies to non-VSAM data sets; allow 4 data set entries for each VSAM cluster.

Each entry in the ARCHIVE Control File will be retained for 1 year, by default. If the default retention period is used, there should be enough space allocated to the ARCHIVE Control File to accommodate 1 year of ARCHIVE activity. It is up to the user to estimate the ARCHIVE activity within his/her own environment.

**90.28 ARCHIVE CONTROL FILE INITIALIZATION**

The following job control statements are necessary to initialize the ARCHIVE Control File.

**JOB  
STATEMENT**

The JOB Statement is user-specified and depends upon standards.

**EXEC  
STATEMENT**

Must specify the name of the ABR archive initialization program -- FDRARCH. It may also contain the region requirements of 256K.

**STEPLIB OR  
JOBLIB DD  
STATEMENT**

If required, must specify the load module library in which ABR resides. The library must be APF authorized.

**SYSPRINT DD  
STATEMENT**

Specifies the output message data set. This is a required DD statement and usually is a SYSOUT data set.

**SYSUDUMP DD  
STATEMENT**

Specifies the abend dump data set. Although not required, we strongly urge you to always include this DD statement so we can help you diagnose your error conditions. Usually a SYSOUT data set.

**ARCHIVE DD  
STATEMENT**

Specifies the ARCHIVE Control File. The data set must be allocated to a disk volume. The data set name must contain the characters 'ARCHIVE' at the beginning of the second or later index level. If not, you may specify NODSNCK, but you will not be able to use the ARCBACKUP=DSF option during ARCHIVING ([See Section 51.03](#)). No DCB parameters may be specified. Secondary allocation and 'RLSE' are supported and recommended.

**SYSIN DD  
STATEMENT**

Specifies the control statement data set. Usually an input stream or DD \* data set.



## 90.29 THE FORMAT COMMAND

<b>FORMAT COMMAND</b>	The FORMAT Command is used to initialize the ARCHIVE Control File. <b>FORMAT</b> <i>B=n</i>   <i>,NODSNCK</i>   <i>,RECS=nnnnnnnn</i>   <i>USERINDEX=NO / YES</i>
<b>OPERANDS</b>	<p><b>B=</b>      Specifies the number of blocks to be placed on each track. May be a number from 1 through 5 inclusive. ABR will automatically calculate the best blocksize for this device. The default value is 2 (half track blocking).</p> <p><b>NODSNCK</b> Specifies that the name of the ARCHIVE Control File is not to be validated. The default is that the name of the ARCHIVE Control File must have an index level starting with 'ARCHIVE' after the highest level index. The remaining characters are up to the discretion of the user. If the name is not in this form, the ARCBACKUP=DSF option cannot be used during ARCHIVING (<a href="#">See Section 51.03</a>).</p> <p><b>RECS=</b>      Specifies, in conjunction with the space parameter on the ARCHIVE DD statement, the number of data set entries that will be formatted on the ARCHIVE Control File. May be a number between 1 and 1,000,000 (1 million) inclusive. The default is 2000. Sufficient space must be allocated to the ARCHIVE Control File to contain the specified (or defaulted) number of data set entries. This space may include secondary allocations. If the space parameter specifies the RLSE operand, then FDRARCH will format as many blocks as necessary to contain the specified (or defaulted) number of data set entries. The Operating System will release any excess space. If the space parameter does not specify the RLSE operand, then FDRARCH will format at least the entire primary space allocation.</p> <p><b>USERINDEX=YES</b>—specifies that the ARCHIVE Control File is to be formatted with an indicator that causes FDRABR to change its normal convention for naming backup files on tape or disk for any ARCHIVE step which references this Control File. The high-level index of such backup files will be the same as the high-level index of this ARCHIVE Control File. This is intended for use with the SCRATCH=NO operand of ARCHIVE DUMP (the application backup system described in <a href="#">Section 52.08</a>) and should not be used when formatting a Control File for any other purpose. <b>NO</b>—specifies that the indicator will not be set and any ARCHIVE backup files created using this Control File will follow ABR's normal naming convention (as described in <a href="#">Section 52.05</a>). Default is NO.</p>

**90.30 DRARCH JCL EXAMPLES**

**EXAMPLE 1** Allocate the ARCHIVE Control File to a 3380 volume. Allow space for approximately 30,000 archived data sets. Default to 2 blocks/track. Name the data set FDRABR.ARCHIVE.

```
//FORMAT      EXEC          PGM=FDRARCH, REGI ON=256K
//SYSPRI NT    DD           SYSOUT=*
//ARCHI VE     DD           DSN=FDRABR. ARCHI VE, DI SP=( , CATLG) ,
//             UNI T=3380, SPACE=(CYL, ( 10, 3) , RLSE)
//SYSI N       DD           *
//             FORMAT      RECS=30000
/*
```

**EXAMPLE 2** Allocate a test ARCHIVE Control File to a 3390 device. Allow space for approximately 500 ARCHIVED data sets. Create the ARCHIVE Control file with quarter-track records. Name the data set TEST.ARCHIVE.USERFILE.

```
//FORMAT      EXEC          PGM=FDRARCH, REGI ON=256K
//SYSPRI NT    DD           SYSOUT=*
//ARCHI VE     DD           DSN=TEST. ARCHI VE. USERFI LE,
//             DI SP=(CATLG) , UNI T=3390, SPACE=(TRK, ( 2, 2) )
//SYSI N       DD           *
//             FORMAT      B=4, RECS=500
/*
```

**91.01 GLOBAL OPTION CHANGE FACILITY — OVERVIEW AND JCL**

Many options which affect the FDR system may be changed permanently. All such options are kept in a load module called FDROPT, in the FDR program library (additional options for FDRREORG and FDREPORT are kept separately, [See Sections 26](#) and [53.24](#) respectively). Many of these options affect the defaults for various operands on FDR control statements and can be overridden at execution time; others may be changed only in FDROPT and cannot be overridden.

There are also some tables, such as the ABR protect lists and the COMPAKTOR unmovable table, which are stored as load modules in the FDR program library.

There are two ways of modifying these options and tables. The FDR ISPF dialogs, described in [Section 92](#), may be used to set all options and tables. If you have the dialogs installed, this is the preferred way, since all options are displayed with online help to describe them. If you have not installed the dialogs or prefer not to use them, all options and tables may be set with program FDRZAPOP, the Global Option Change facility.

The following sections document the FDR options and tables. For ease of use, they are documented here in the same order that they appear on the FDR ISPF panels, and the FDRZAPOP PRINT command will print the current options in the same order as the panels. Each following section refers to the corresponding ISPF panel by its invocation name (e.g, A.I.4.1).

You should carefully review the options available for the FDR system, especially the security options, before you implement FDR in your production system. Some of the options, especially the ABR options of the high level index names, OLDBACKUP fields, and TMS option, must be set before the testing starts or progresses too far. If these options are changed after backups or ARCHIVES are done, the previous information may be lost.

**BATCH EXECUTION**

To execute FDRZAPOP as a BATCH job use the following JCL:

**JOB STATEMENT**

The JOB Statement is user specified and depends upon installation standards.

**EXEC STATEMENT**

Must specify the program name of the Global Option Change Facility – FDRZAPOP.

**STEPLIB or JOBLIB DD STATEMENT**

If required, must specify the load module library in which FDR programs reside.

**SYSPRINT DD STATEMENT**

Specifies the output message data set. This is a required DD statement and usually is a SYSOUT data set.

**SYSLIB DD STATEMENT**

Must specify the load module library in which FDR programs reside.

**SYSIN DD STATEMENT**

Specifies the control statement data set required for all functions. Usually an input stream or DD \* data set.

**TSO EXECUTION**

The FDRZAPOP can be executed under TSO. The program will prompt you for the commands. The 'END' command will save the modified options, if any, and terminate the program. The 'CANCEL' command will discard any modified options and terminate. The allocations required to execute FDRZAPOP in the TSO Foreground are as follows:

```
ALLOC          F(SYSLIB)      DA('fdr.library') SHR
ALLOC          F(SYSPRINT)    DA(*)
ALLOC          F(SYSIN)       DA(*)
FDRZAPOP
----- or if the FDR library is not on LINKLIST-----
CALL 'fdr.library'(FDRZAPOP)
```

## 91.02 GLOBAL OPTION CHANGE FACILITY — FORMAT AND OPTIONS

**AVAILABLE  
FUNCTIONS**

The Global Option Change Facility has the following commands:

**ALLOCATE**— Add ALLOCATE commands to the ABR RESTORE Allocation Control List. This command is described in [Section 91.05](#).

**CPKUNMOV**— Add entries to the COMPAKTOR Unmovable Table. This command is described in [Section 91.04](#).

**EXCLUDE** — Add EXCLUDE commands to the ABR Incremental Backup Protect List. This command is described in [Section 91.05](#).

**HELP** — The HELP command will print a menu of the FDRZAPOP options and related documentation.

The HELP command format is:

**HELP** or **HELP SUB(command)** or **HELP ALL**

**PRINT** — If the PRINT command is specified without any operands, the current values in the FDR Global Options Table will be printed. If one or more operands ('table' options) are specified on the PRINT command, the specified tables will be printed.

The PRINT command format is:

**PRINT** *table1,table2,...*

The 'table' options are as follows:

CPKUNMOV	—	COMPAKTOR Unmovable Table
ABRPROT	—	ABR Incremental Backup Exclude List
ARCPROT	—	ABR ARCHIVE Protect List
SCRPROT	—	ABR SUPERSCRATCH Protect List
RESTPROT	—	ABR RESTORE Protect List
ALLOCATE	—	ABR RESTORE Allocation Control List

**PROTECT** — Add PROTECT commands to the ABR ARCHIVE Protect List. This command is described in [Section 91.05](#).

**RESET** — If the RESET command is specified without any operands, the FDR Global Options Table will be reset to the original values on the installation tape. If one or more operands ('table' options) are specified on the RESET command, the specified tables will be reset to their original contents on the installation tape.

The RESET command format is:

**RESET** *table1,table2,...*

The 'table' options are as follows:

CPKUNMOV	—	Reset the COMPAKTOR Unmovable Table
ABRPROT	—	Reset the ABR Incremental Backup Exclude List
ARCPROT	—	Reset the ABR ARCHIVE Protect List
SCRPROT	—	Reset the ABR SUPERSCRATCH Protect List
RESTPROT	—	Reset the ABR RESTORE Protect List
ALLOCATE	—	Reset the ABR RESTORE Allocation Control List

CONTINUED . . .

## 91.02 CONTINUED . . .

- RESTPROT**— Add EXCLUDE commands to the ABR RESTORE Protect List. This command is described in [Section 91.05](#).
- SCREXCL** — Add PROTECT commands to the ABR SUPERSCRATCH Protect List. This command is described in [Section 91.05](#).
- ZAP** — Modify options in the FDR Global Options Table. This command enables the installation to enable or disable specified functions and set control statements defaults and other processing options for the FDR system. The operands for this command are documented by function in the following Sections.
- The ZAP command format is:

**ZAP**    *ENABLE=(option1,...,optionn) |*  
          *,DISABLE=(option1,...,optionn) |*  
          *,operand=value,...,operand=value*

## 91.03 GLOBAL OPTION CHANGE FACILITY — FOR ALL PROGRAMS

This section discusses options that apply to most of the programs within the FDR system.

**SECURITY  
OPTIONS  
(PANEL A.I.4.1)**

The programs in the FDR system, as a default, bypass most volume or data set security built into the Operating System. FDR does not go through a normal OPEN procedure when dumping, ARCHIVING or restoring data sets, so **there will be little or no security checking for FDR operations unless you enable the proper FDR options**. By default, all of the security options below are disabled. The FDR system supports several different types of security. Also, use of the new name options and absolute track functions can be prevented. [Section 91.06](#) provides complete details on the security options, but briefly they are:

- ALLCALL** – if enabled, FDR does RACF-compatible security checks for all datasets. To change, ZAP ENABLE/DISABLE=ALLCALL
- RACF** – if enabled, FDR does RACF-compatible security checks only for datasets with the RACF flag on (protected by a discrete profile). Do not use this option if you have any generic profiles or a non-IBM security system. To change, ZAP ENABLE/DISABLE=RACF  
NOTE: you can enable either ALLCALL or RACF, not both. If in doubt, use ALLCALL.
- OPENALL** – if enabled, FDR does an OPEN on every dataset, allowing the OPEN to do security checking. Because of the overhead, DO NOT use this unless you have a non-standard security system not supported any other way. To change, ZAP ENABLE/DISABLE=OPENALL
- FDRPASS** – if enabled, FDR does a simplified volume-level security check. Use this only if you do NOT have a RACF-compatible security system. To change, ZAP ENABLE/DISABLE=FDRPASS
- NOABSTRK** – if enabled, prevents FDRDSF from doing any absolute track operations (SELECT FROM/TO) since no dataset-level checking can be done for them. To change, ZAP ENABLE/DISABLE=NOABSTRK
- NONEW** – if enabled, datasets may not be restored or copied to a new name (the NEWNAME, NEWGROUP, NEWINDEX, and NEWDD operands will be invalid). To change, ZAP ENABLE/DISABLE=NONEW

**SECURITY  
EXITS**

In addition to the security options above, FDR supports two user-supplied security exits: a Disk Volume OPEN exit and a Data Set Security exit. The Disk Volume OPEN exit gets control each time a disk volume is OPENed by the FDR system. The Data Set Security exit gets control for each data set processed. [Section 91.10](#) (provided only in the machine-readable version of the manual in the FDR documentation library) provides details on these exits. ACF2 users should note that these exits are no longer required for ACF2 support; [See Section 91.06](#).

**GENERAL  
OPTIONS  
(PANEL A.I.4.2)**

These options are used by most FDR programs. If using the FDR ISPF dialogs, all these options can also be changed on panel A.I.4.2.

**APPSFX**

Many of the FDR programs use an End-of-Extent Appendage, a special EXCP exit used to set I/O options. Appendages have a name in the form IGG019xx (xx from WA to Z9) and are normally placed in SYS1.SVCLIB or SYS1.LPALIB. The FDR appendage is called IGG019YZ, by default. since FDR programs are authorized, this appendage does not need to be moved to SVCLIB/LPALIB and does not need to be added to the system appendage list (IEAAPPxx). FDR will load the appendage from the normal FDR program library.

However, if you already have an appendage by the name IGG019YZ in use (perhaps by another program product), you may need to change the name of the FDR appendage to an appendage name not already in use. To do so, rename load module IGG019YZ in the FDR load library to IGG019xx (xx from WA to Z9) with IEHPROGM or ISPF, and inform FDR of the change with ZAP APPSFX=xx.

CONTINUED . . .

**91.03 CONTINUED . . .**

- BUFNO** As a default, during a DUMP or COPY FDR will acquire enough buffers to retain a cylinder of data in storage at a time (ZAP BUFNO=MAX). You can specify that a smaller number of buffers be used (ZAP BUFNO=nn) but this will cause a less-efficient I/O technique to be used and so will impact FDR performance. Since this can be overridden at execution time by the BUFNO= operand, Innovation does not recommend changing this option.
- ICFCORE** In order to match ICF VSAM component names to cluster names, the FDR dataset dump programs must build a table of such names. The default size of this table is 56K if the input disk is a 3390 (which holds about 650 components) and 48K for other disks (which holds about 600 components). If any input disk may contain more than this number of ICF components, the table must be enlarged. The default value for ICFCORE (50000) says to use these defaults. Setting ICFCORE to any other value, in bytes, with ZAP ICFCORE=nnnnnn, will cause a larger table to be acquired. However, the storage requirements of any FDR dump which processes a volume with ICF VSAM present will be increased by the ICFCORE value (the default values do not add any extra storage).
- FDRCC** In an error occurs during execution of FDR, FDRDSF, FDRCOPY, or FDRTCOPY that is not severe enough to cause immediate termination, these programs complete their processing and then issue an ABEND or set a return code to call attention to the error. The default (ZAP FDRCC=ABEND) causes an ABEND U0888. If you wish a return code instead of the ABEND, use ZAP FDRCC=nn to set any desired value from 8 to 255.
- LBPZERO** By default, the FDR system treats empty sequential data sets (PS data sets with a last block pointer of all zeroes) as being full, in case the last block pointer is incorrect, and will dump or restore the entire data set. COMPAKTOR will not release the empty space within such data sets. If you wish to treat these data sets as empty, specify ZAP LBPZERO=VALID. FDR and COMPAKTOR will treat these data sets as having one used track, except that the report programs FDRABRP and FDREPORT will treat these data sets as having zero used tracks. To reset this option, use ZAP LBPZERO=INVALID. This option can be overridden at execution time (except for program FDRABRP).
- LINECNT** You can override the maximum number of lines to be printed on any report page produced by the FDR system. The default is 58 lines per page. To change this default, specify ZAP LINECNT=nn, where nn may be a number from 10 to 99. This option can be overridden at execution time.
- SELTERR=NO** The FDR system will produce a diagnostic message if a SELECT or EXCLUDE or related control statement, specifying a data set name or filter, does not actually match any of the data sets processed in the step (in other words, the control statement was not used). By default, FDR considers this a possible user error and causes a return code or U0888 abend at step end to draw attention to it. If you do not want to consider this an error condition, specify ZAP SELTERR=NO (the diagnostic message will still be printed). To reinstate the ABEND or condition code, specify ZAP SELTERR=YES. This option can be overridden at execution time.
- POOLDASD** This enables support for POOLDASD, a disk allocation management product from Empact Software, for non-VSAM data sets (POOLDASD support for VSAM clusters is automatic and functions even if this option is disabled). This support requires a POOLDASD module, PLDRSTIN. If this module is not currently available in your POOLDASD program library, contact Empact for assistance. If this option is enabled and PLDRSTIN is available, FDR will interface to POOLDASD to obtain target volumes for non-VSAM data sets. To enable or disable, specify ZAP ENABLE=POOLDASD or ZAP DISABLE=POOLDASD.
- MESSAGE ROUTING AND DESCRIPTOR CODES** The routing and descriptor codes used for most of the operator messages in the FDR system can be changed. The default value for the routing codes is (2,11), and for the descriptor code is 2. The routing and descriptor codes are documented in the IBM manual Routing and Descriptor Codes and are used by MVS to control which consoles the messages will appear on, and how they will be displayed. To change them, specify ZAP ROUTECODE=(nn,...,nn) and/or ZAP DESCRIPTCODE=(nn,...,nn).

## 91.04 GLOBAL OPTION CHANGE FACILITY — OPTIONS BY PROGRAM

This section discusses options that apply to the COMPAKTOR or ABR programs within the FDR system.

**COMPAKTOR  
UNMOVABLE  
TABLE (PANEL  
A.I.5)**

The COMPAKTOR Unmovable Table (module FDRCPKUM in the FDR program library) contains the names of data sets or data set groups which are to be considered unmovable for COMPAKTion.

SYS1.VTOCIX., SYS1.VVDS. and SYS1.LOGREC are always in the internal COMPAKTOR Unmovable Table. [Section 40.24](#) of this manual lists the data sets which should be added to the COMPAKTOR Unmovable Table.

If you maintain the COMPAKTOR Unmovable Table using the ISPF dialog (panel A.I.5), then you add or delete entries by using line commands (I - insert; D -- delete; R -- repeat). When installing a new release, use the COPY command on panel A.I.5 to copy your installation's COMPAKTOR Unmovable Table from the prior release.

If you maintain the COMPAKTOR Unmovable Table using program FDRZAPOP, the table should exist in two forms: an external form and an internal form. The external form of the table consists of input to FDRZAPOP. This external form can be stored anywhere, but the recommended location is member 'CPKUNMOV' on the Installation Control Library. You add or delete entries by editing the CPKUNMOV commands (see below) in the external form of the table, using ISPF EDIT or any other editor, and then using the external form as the SYSIN input to program FDRZAPOP. When FDRZAPOP processes this input, it builds the internal form of the COMPAKTOR Unmovable Table, which is stored in load module 'FDRCPKUM' on the FDR program library and is used at execution time. When installing a new release, use the external form as input to FDRZAPOP. If you are storing the external form as a member of the Installation Control Library, as recommended, copy that member to the Installation Control Library for the new release.

The CPKUNMOV command format is:

**CPKUNMOV**      *DSN=filter* | *DSG=dsgroup*

DSN= specifies a fully-qualified data set name or a filter ([See Section 52.16](#)) that selects the unmovable data sets. DSG= specifies a partially-qualified name to select a group of data sets. COMPAKTOR does not support VSAM cluster names; you must specify each individual component name, or use a filter or DSG= that selects them. Only one DSN= or DSG= may be specified per CPKUNMOV statement.

You may exclude (protect) certain volumes from COMPAKTOR processing by making special entries in the COMPAKTOR Unmovable Table. If COMPAKTOR finds a name in the Unmovable Table in the format:

```
FDRCPK. EXCLUDE. COMPAKT. Vvvvvvvv
```

any attempt to do any COMPAKTion on volume "vvvvvv" will result in a warning. If the name is:

```
FDRCPK. EXCLUDE. RELEASE. Vvvvvvvv
```

then space release (TYPE=RLSE) will be inhibited. If the name in the table is a DSN entry, then only the named volume is excluded. If the entry is a DSG, then "vvvvvv" must be 5 or fewer characters and all volumes starting with that prefix will be excluded.

To print the entries currently in the internal form of the COMPAKTOR Unmovable Table, execute program FDRZAPOP with the command PRINT CPKUNMOV.

To reset the internal form of the COMPAKTOR Unmovable Table to the entries on the installation tape, use the RESET command on ISPF panel A.I.5, or execute program FDRZAPOP with the command RESET CPKUNMOV. If you maintain the COMPAKTOR Unmovable Table using program FDRZAPOP, the RESET CPKUNMOV command should always be the first command in the external form of the table, in order to remove the previous contents when you recreate the table.

**EXPANDING  
THE  
COMPAKTOR  
UNMOVABLE  
TABLE**

The maximum number of entries in the Unmovable Table depends on the size of each entry. The ISPF dialog, or program FDRZAPOP will notify the user if the table is full. Member 'FDRCPKUM' on the Installation Control Library contains the source code for the internal form of the Unmovable Table along with the JCL that can be used to assemble and linkedit the load module in case you need to expand it.

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## 91.04 CONTINUED . . .

- COMPAKTOR OPTIONS (PANEL A.I.4.3)** In addition to the general options detailed in [Section 91.03](#), the following options apply only to COMPAKTOR (program FDRCPK). If using the FDR ISPF dialog, all these options can also be changed on panel A.I.4.3.
- ACTMESS** As a default, during a real COMPAKTion (COMPAKT TYPE=COMPAKT), if any other tasks have the volume allocated, COMPAKTOR will issue message FDRW81 to warn the operator. This message requires a reply. If all of the precautions listed in [Section 40.24](#) ("COMPAKTing Active Volumes") are observed for all your COMPAKTOR jobs, then it is safe to COMPAKT a volume while it is in use, and this message is not needed. To change the default so that COMPAKTOR will not issue message FDRW81, specify ZAP ACTMESS=NO. To return to a default of allowing the message to be issued, specify ZAP ACTMESS=YES. The default can be overridden at execution time by specifying ACTMESS=YES or NO.
- CPKCC** In an error occurs during execution of COMPAKTOR that is not severe enough to cause immediate termination, it completes processing and then issues an ABEND or sets a return code to call attention to the error. The default (ZAP CPKCC=ABEND) causes an ABEND U0888. If you wish a return code instead of the ABEND, use ZAP CPKCC=nn to set any desired value from 8 to 255. However, if CPKCC is set to ABEND, but FDRCC ([See Section 91.03](#)) is set to a return code, COMPAKTOR will use the FDRCC return code.
- CPKABSUN** COMPAKTOR normally will treat data sets which are allocated with absolute track allocation (SPACE=(ABSTRK,..)) as movable. If you want COMPAKTOR to treat them as unmovable, specify ZAP ENABLE=CPKABSUN. To make them movable, specify ZAP DISABLE=CPKABSUN.
- CPKOVRIID** COMPAKTOR, as the default, will not allow the user to supply SELECT DSN commands for the data sets in the Unmovable Table or data sets identified as active by the DSNENQ= operand, and will exclude these data sets from the operation of SELECT DSG commands. To change the default so that SELECT commands will be allowed to move unmovable data sets (including SYS1.VTOCIX., SYS1.VVDS. and SYS1.LOGREC), specify ZAP ENABLE=CPKOVRIID. To return to a default of not allowing SELECT commands to move them, specify ZAP DISABLE=CPKOVRIID.
- On the ISPF panels, this option can be changed on the CPK options panel (A.I.4.3) OR on the CPK unmovable table panel (A.I.5).
- However, this option can also be specified at execution time, by the OVERRIDE= operand on the COMPAKT statement. In order to prevent data sets which are supposed to be unmovable from being accidentally moved by SELECT statements, **Innovation strongly recommends that the CPKOVRIID option NOT be enabled in the option table, so that jobs which really need to move such datasets MUST specify OVERRIDE=YES.**
- HILIGHT** As a default, COMPAKTOR will highlight certain data on the maps in order to make it stand out. This is done by overprinting the line three times. If you do not want COMPAKTOR to default to using highlighting, specify ZAP HILIGHT=NO. To return to using highlighting as a default, specify ZAP HILIGHT=YES. The default can be overridden at execution time by specifying HILIGHT=YES or NO.
- RECOMMENDATION: If COMPAKTOR listings are seldom or never printed on impact printers, specify NO as the default for highlighting.
- SCRATCH** If you wish to disable the SCRATCH function in COMPAKTOR (the ability to scratch non-VSAM datasets during COMPAKTion with the SCRATCH=YES operand on a SELECT statement), specify ZAP SCRATCH=INVALID. To re-enable SCRATCH, specify ZAP SCRATCH=VALID.

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<b>COMPAKTOR RELEASE SPACE</b>	The COMPAKTOR function of releasing excess space, during either TYPE=RLSE or TYPE=COMPAKT, may be limited to data sets that have a secondary allocation value defined; thus the installation may exclude data sets that have only primary allocation defined, and are unable to acquire secondary extents if they need to expand. As a default, secondary allocation is not checked when releasing space. To change the default so that COMPAKTOR will not release space from data sets that do not have a secondary allocation value, specify ZAP NOSECOND=NORLSE. To return to a default of allowing COMPAKTOR to release space from data sets that do not have a secondary allocation value, specify ZAP NOSECOND=RLSE. The default can be overridden at execution time by specifying NOSECOND=NORLSE or NOSECOND=RLSE.
<b>SIZEKEEP DEFAULTS</b>	The SIZEKEEP operand of COMPAKTOR, explained in <a href="#">Sections 40.08</a> and <a href="#">40.17</a> , has 3 suboperands. The default values for those suboperands are specified by the options SIZEKEEP, FREEAREA, and MAXKEEP respectively. The distributed defaults are SIZEKEEP=100 (tracks), FREEAREA=90 (percent), and MAXKEEP=5 (extents). You can change the defaults with ZAP SIZEKEEP=nnnnnn, FREEAREA=nnn,MAXKEEP=nn. You can specify any or all of these values. However, the defaults can also be overridden at run time by the SIZEKEEP operand on the COMPAKT statement.
<b>ABR OPTIONS</b>	In addition to the general options detailed in <a href="#">Section 91.03</a> , the following options apply only to ABR (the DASD Management portion of the FDR system). If using the FDR ISPF dialogs, these options can also be changed on ISPF panels A.I.4.4 through A.I.4.8.
<b>ABR GENERAL OPTIONS (PANEL A.I.4.4)</b>	These options are used by components of ABR, in addition to the FDR general options described in <a href="#">Section 91.03</a> . If using the ISPF dialogs, they can also be changed on ISPF panel A.I.4.4.
<b>ABRCC</b>	In an error occurs during execution of ABR that is not severe enough to cause immediate termination, it completes processing and then issues an ABEND or sets a return code to call attention to the error. The default of 12 sets return code 12. If you wish to change the return to use ZAP ABRCC=nn to set any desired value from 8 to 255. If you wish ABR to end with ABEND U0888 specify ZAP ABRCC=ABEND.
<b>DISKUPDATE</b>	By default, the ABR remote queue utility (FDRABRUT) will update the DSCBs of selected data sets directly when a remote queue backup or archive is requested. FDRABRUT must be executing as an authorized program to do so. If FDRABRUT may be executed unauthorized, or if you don't want to update the DSCBs directly, specify ZAP DISKUPDATE=NO; this will cause FDRABRUT to use remote queue datasets (see "Remote Queue Datasets" later in this section and <a href="#">sections 50.04</a> and <a href="#">51.02</a> ). To return to the default of updating the DSCBs, specify ZAP DISKUPDATE=YES. FDRABRUT will always use remote queue datasets for restores from backup and archive.  Note that when FDRABRUT is executed because of a request for a remote queue operation from the FDR ISPF panels (the most common case), there is a dialog option which specifies whether to force DISKUPDATE=YES or NO or to use the default in the Global Option Table. As distributed, it uses the global value, but this can be changed on panel A.I.10.

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**ICFSU60** As a default, systems with MVS/370 DFP and MVS/XA DFP (Version 1 or 2) do not record Update and Last Reference Date information for ICF VSAM clusters. You must install an ICF VSAM modification to record the Update Indicator and the Last Reference Date for VSAM data sets. To install this modification, [See Section 92.05](#) Step 13 (ISPF panel A.I.13.3), or [Section 90.12A](#).

You must inform ABR that Update and Last Reference Date information is being recorded for ICF VSAM clusters by specifying ZAP ENABLE=ICFSU60. ABR will then support incremental backup for ICF VSAM, and ARCHIVE and SUPERSCRATCH based on Last Reference Date.

If you are running an MVS system with DFP/MVS Version 3.x installed or with DFSMSdfp V1.x or above installed (which includes all MVS/ESA systems), you do not have to install the modification since it is now included as a default by IBM. Also, you do not need to enable ICFSU60 since ABR will detect the DFP level and assume it (it will still be displayed as NOs on the ISPF panels and in the FDRZAPOP PRINTs).

**TMS** The techniques used by ABR are compatible with tape management systems, such as CA-1, CA-TLMS, etc. The user must inform ABR that Tape Management exists in the Operating System by specifying ZAP ENABLE=TMS. Note that the TMS option refers to ALL tape management systems, not just CA-1 (formerly known as TMS). For details on "How ABR Interfaces with Tape Management Systems", [See Section 52.12](#).

**ARCRecall** By default, ABR ARCHIVE will not catalog archived data sets for automatic recall unless the RECALL or RECALL=YES options are specified on the DUMP TYPE=ARC statement. Since many installations want most archived datasets to be eligible for auto-recall, you can make RECALL=YES the default by ZAP ENABLE=ARCRecall. This default can be overridden for specific ARCHIVE runs with RECALL=NO. This option has no effect on ABR application backup (DUMP TYPE=ARC,SCRATCH=NO).

**MIGRAT** By default, if ABR ARCHIVE catalogs archived data sets for automatic recall (RECALL=YES in effect), the catalog entry will retain the original volser of the disk from which the data set was archived, unless the MIGRAT=YES option is specified on the DUMP TYPE=ARC statement, in which case the volser "MIGRAT" is used instead. You can make MIGRAT=YES the default by ZAP ENABLE=MIGRAT. This default can be overridden for specific ARCHIVE runs with MIGRAT=NO. This option is ignored for DB2 clusters. [See Section 52.22](#) for more details.

**ARCOPY** By default, ABR ARCHIVE restores will restore from the COPY1 backup (unless COPY1 has reached its expiration date, in which case COPY2 will be used). You can make COPY2 the default by specifying ZAP ARCOPY=2. However, if COPY2 is expired or unavailable, ABR will NOT switch back to COPY1. This may be useful at a disaster site where only COPY2 is available from offsite storage. You can return to the COPY1 default with ZAP ARCOPY=1. The default can be overridden for any given restore with the COPY=n option on the RESTORE or SELECT statement.

**BKPCOPY** By default, ABR backup restores will restore from the COPY1 backup (unless COPY1 is no longer cataloged, in which case COPY2 will be used). You can make any copy (1 through 9) the default by specifying ZAP BKPCOPY=n. However, if the specified copy is no longer cataloged, ABR will NOT switch back to COPY1. This may be useful at a disaster site where only COPYn is available from offsite storage. The default can be overridden for any given restore with the COPY=n option on the RESTORE or SELECT statement.

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**DYNAMIC  
ALLOCATION  
FLAGS**

ABR will dynamically allocate the backup medium (tape or disk) during restore operations if the DYNTAPE operand is specified (assumed for auto-recall). The options below affect dynamic allocation of the backup data sets. You can set these options in the ALLOCATEFLAG section of ISPF panel A.I.4.4, or by executing program FDRZAPOP with the command ZAP ALLOCATEFLAG=(option1,...,optionn).

**RECOMMENDATION:** Activate the options WTDSN, WTUNT, and WTVOL (except do not activate WTDSN under JES3).

**MOUNT** Allows a TSO user to mount a tape, whether or not the user has MOUNT authority in their TSO profile. This can be used to allow TSO users to do foreground recalls from tape even though they are not normally allowed to mount tapes for their TSO session.

**OFFLN** Allows allocation to consider offline units to mount the backup tape if no online tape units are available. For batch jobs and TSO users with MOUNT authority in their TSO profile, offline units are considered by MVS even if the OFFLN option is not specified. However, if the MOUNT option above is specified, then offline units will not be considered for any ABR allocations, so either MOUNT or OFFLN is enabled, the other should also be enabled.

**RESET** Resets all allocation flags to the default values from the distribution tape. This option is available only under FDRZAPOP, not on the ISPF panel. On the ISPF panel, if you wish to reset all of the FDR Global Options to the default values from the distribution tape, then specify RESET on the COMMAND line. If you wish to reset all of the ALLOCATEFLAG options, then set all of them to NO.

**WTDSN** Allows ABR to wait for the data set name to become available (in case the required backup file was just created by an ARCHIVE job that is still running). This option is recommended for systems with JES2; however, it should not be set in systems with JES3, where it can cause an interlock.

**WTUNT** Allows ABR to wait for an available unit if all eligible units are already in use. This option is recommended for all systems.

**WTVOL** Allows ABR to wait for the tape volume (in case another job is already restoring from the same tape volume needed for this restore). This is always in effect on full volume restores. This option is recommended for all systems.

NOTE: The WTDSN, WTUNT, and WTVOL options can in some circumstances result in a very long wait. You may have to specify TIME=1440 on the EXEC statement to suppress job step timing in order to avoid a timeout (S522 ABEND).

**ABR DATA SET  
NAMES  
(PANEL A.I.4.5)**

These options control naming conventions and data set names used by ABR. Any of the name options shown below can be changed by specifying ZAP option=name. If using the ISPF dialogs, they can also be changed on ISPF panel A.I.4.5.

**ABRINDEX**

ABR uses a first level index name of 'FDRABR' for all backup and ARCHIVE data sets created by FDRABR ([Section 52.04](#) describes the ABR naming convention). In addition, this index level is used in the names of the ABR MODEL DSCBs that are placed in the VTOCs of every volume initialized for ABR processing ("FDRABR.Vvolser"). It is highly recommended that the standard index name of 'FDRABR' be used.

**WARNING: once you have begun to use ABR in production, you cannot change the value of ABRINDEX. Because of the way that backup file names are stored in ABR, changing ABRINDEX will cause ABR to be unable to locate any current backups (ARCHIVE or INCREMENTAL). If you must change it, the change must be made before any production ABR runs are made.**

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- SCRINDEX** This single character (alphabetic or national) plus a period will be prefixed onto the name of any data set that is scratched by MVS, if it also has a current ABR backup. This modified name will be cataloged into the ABR scratch catalog if the ABR DADSM Pre-processing exit is installed ([See Section 92.60](#)). The default is "#" (pound-sign) and Innovation recommends that you do not change it.
- DSNCK** Normally ABR validates the names of the Archive Control File and the remote queue datasets, as explained later under those options. To disable this validation, specify ZAP NODSNCK. To reenable it, use ZAP DSNCK.
- LASTAPE** This option specifies up to 16 characters to be used as the prefix for the data set name used for the LASTAPE option; LASTAPE allows multiple ABR jobs to place backup files on the same tapes as explained in [Section 51.02](#). The prefix must itself be a valid MVS data set name. The default prefix name is 'FDRABR.LASTAPE'.
- POOLDISK** This option specifies up to 16 characters to be used as the prefix for the data set name used for the POOLDISK option; POOLDISK allows ABR to manage a pool of disks used for ABR output files (usually used for ARCHIVE) as explained in [Section 51.02](#). The prefix must itself be a valid MVS data set name. The default prefix name is 'FDRABR.POOLDISK'.
- DOCDSN** This option specifies the name of the FDR online documentation data set. This data set will be used by the ISPF MESSAGE QUERY PANEL (option A.M). The default name is 'IDP.DOCFDR52'.
- ARCDSN** This option specifies the name of the default ARCHIVE Control File (up to 44 characters). ABR will dynamically allocate this file for the AUTOMATIC RECALL of data sets and for any ARCHIVE job specifying the DYNARC option. One index level of the name (other than the first) must be 'ARCHIVE' unless the DSNCK option has been disabled. The default name is 'FDRABR.ARCHIVE'.
- ARCHDMPQ** This option specifies the name of the default ARCHIVE DUMP Remote Queue data set (up to 44 characters). The Remote Queue utility, FDRABRUT, will dynamically allocate this data set and add ARCHIVE DUMP requests to it, if the DISKUPDATE option is disabled. One index level of the name (other than the first) must be 'ABRARDQ' unless the DSNCK option has been disabled. The default name is 'FDRABR.ABRARDQ.DATA'. [See Section 51.02](#) for the use of this data set by ABR.
- ARCHRSTQ** This option specifies the name of the default ARCHIVE RESTORE Remote Queue data set (up to 44 characters). The Remote Queue utility, FDRABRUT, will dynamically allocate this data set and add ARCHIVE RESTORE requests to it. One index level of the name (other than the first) must be 'ABRARCH' unless the DSNCK option has been disabled. The default name is 'FDRABR.ABRARCH.DATA'. [See Section 51.05](#) for the use of this data set by ABR.
- BKUPDMPQ** This option specifies the name of the default BACKUP DUMP Remote Queue data set (up to 44 characters). The Remote Queue utility, FDRABRUT, will dynamically allocate this data set and add BACKUP DUMP requests to it, if the DISKUPDATE option is disabled. One index level of the name (other than the first) must be 'ABRBKDQ' unless the DSNCK option has been disabled. The default name is 'FDRABR.ABRBKDQ.DATA'. [See Section 50.04](#) for the use of this data set by ABR.

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## 91.04 CONTINUED . . .

- BKUPRSTQ** This option specifies the name of the default BACKUP RESTORE Remote Queue data set (up to 44 characters). The Remote Queue utility, FDRABRUT, will dynamically allocate this data set and add BACKUP RESTORE requests to it. One index level of the name (other than the first) must be 'ABRREST' unless the DSNCK option has been disabled. The default name is 'FDRABR.ABRREST.DATA'.  
[See Section 50.07](#) for the use of this data set by ABR.
- Note: if you plan to use any or all of the 4 remote queue datasets, you must pre-allocate them. This can be done with ISPF or JCL (e.g., IEFBR14). They are simple sequential (PS) datasets, with RECFM=FB, LRECL=80, and any blocksize you desire.
- ALLINDEX** This option is available only through FDRZAPOP, and not on the ISPF panels. ZAP ALLINDEX=index will change ABRINDEX plus it will change the first index level of any of the other names whose first index matches the previous value of ABRINDEX. So, it is a quick way of changing the 'FDRABR' default in all names where it appears.
- ARCHIVE UTILITY DEFAULTS (PANEL A.I.4.6)** These options are defaults used by FDRARCH, the ARCHIVE Control File Maintenance Utility ([described in Section 55.10](#)). Most of these can be overridden at execution time. If using the ISPF dialogs, these can also be changed on panel A.I.4.6.
- BLKF** This is the default blocks per track (1 through 5) formatted in the ARCHIVE Control File. You can change it with ZAP BLKF=n.
- %REORG** Whenever the percentage of free space remaining in the ARCHIVE Control File drops below this value, a PRINT ARCHIVE (program FDRABRP, [Section 53.05](#)) will issue warning recommending reorganization. The default is 10. You can change it to any value from 5 to 75 with ZAP %REORG=nn.
- ARCHIVE** Specifies the DD name used by FDRARCH to refer to the ARCHIVE Control File. The default is 'ARCHIVE'. Change it with ZAP ARCHIVE=ddname.
- DYNARC** Specifies that FDRARCH is to dynamically allocate the default ARCHIVE Control File in the ABR option table (described earlier) if the 'ARCHIVE' DD is not present in the FDRARCH JCL. Enable it with ZAP DYNARC, or disable it with ZAP NODYNARC. The default is NODYNARC, but it can be overridden at execution time. Note that this does not affect the DYNARC option of ABR itself; the DYNARC option must be specified on ABR DUMP and RESTORE statements.
- ERASE** Specifies that FDRARCH is permitted to re-format (overwrite) an existing ARCHIVE Control File. Enable it with ZAP ERASE, or disable it with ZAP NOERASE. The default is NOERASE, but it can be overridden at execution time.
- ARCRESV** Specifies that FDRARCH is to protect the ARCHIVE Control File with a RESERVE during any update. Enable it with ZAP ARCRESV=YES, or disable it with ZAP ARCRESV=NO. The default is YES, and Innovation recommends that you do not change it (damage to the Archive Control File may otherwise result unless you can be certain no other ABR process will be updating it concurrently).
- MAXTREORG** During a FDRARCH REORG function, FDRARCH must build a table of all of the unique ARCHIVE backup data set names encountered. This specifies the minimum size of the table; however, since the table can spill to a dynamically allocated disk file REORG can usually handle many more than this minimum. If necessary, change it with ZAP MAXTREORG=nnn (100 to 32000). It can be overridden at execution time.

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**RECALL** During a FDRARCH REORG function, this option allows FDRARCH to uncatalog the auto-recall catalog entry for any data set being deleted from the ARCHIVE Control file by the REORG. Enable it with ZAP RECALL=YES or disable it with ZAP RECALL=NO. The default is YES. It can be overridden at execution time.

**UNCAT** During a FDRARCH REORG function, this option allows FDRARCH to uncatalog any cataloged ARCHIVE backup data sets that are being deleted from the ARCHIVE Control file by the REORG. Enable it with ZAP UNCAT=YES or disable it with ZAP UNCAT=NO. The default is YES. It can be overridden at execution time.

**MSG** During a FDRARCH REORG function, this option causes FDRARCH to print a message about any cataloged ARCHIVE backup data sets being uncataloged because of the UNCAT option above. Enable it with ZAP MSG=YES or disable it with ZAP MSG=NO. The default is YES. It can be overridden at execution time.

**ABR DISK PROCESSING OPTIONS (PANEL A.I.4.7)** These options are defaults used by FDRABRM, the ABR VTOC Maintenance Utility (described in [Sections 55.01](#) and [90.20](#)) and the ABR ISPF panel A.I.8 (SET ABR VOLUME PROCESSING OPTIONS). Most of these can be overridden at execution time. It also includes options relating to ABR OLDBACKUP processing. If using the ISPF dialogs, these can also be changed on panel A.I.4.7.

**OLDBACKUP OPTIONS** The ABR Incremental Backup system always records the most current backup cycle on which a given data set was backed up. In addition, ABR provides the option of recording up to 13 previous backups. If this option is used, then a user who wants to restore a data set from a backup that is not the most recent can simply specify an old backup number for the BACKUP SOURCE option on ISPF panel A.2 or A.5, or specify OLDBACKUP=number in the control statements for a batch restore job. Otherwise the user would have to specify the CYCLE and possibly the generation.

The OLDBACKUP option is activated on a volume by volume basis by the ISPF panel FDR INSTALLATION--SET ABR VOLUME PROCESSING OPTIONS (option A.I.8), or by the ABRINIT or MAINT commands of program FDRABRM ([Sections 90 or 55](#)). These functions set an option flag enabling OLDBACKUP in the ABR MODEL DSCB on each volume.

ABR uses reserved bytes in the Format 1 DSCB for each data set to retain the OLDBACKUP information. Formerly three areas within the DSCB were available for recording OLDBACKUP information, but changes by IBM for DFSMS and other functions now make only one area usable. This is the field DS1SYSCD, which starts at displacement 62 and is 13 bytes long, which permits recording of the largest possible number of OLDBACKUP cycles. This is the default OLDBACKUP area in the FDR option table.

On volumes where the OLDBACKUP feature is enabled, the OLDBOFF option specifies the offset of the field within the DSCB that ABR is to use to record previous backup cycles, and the OLDBENT option specifies the number of previous backup cycles that ABR is to record (i.e., the length of the field). Each cycle occupies one byte. The value for OLDBENT may be from 2 to 13; the maximum value depends on the value of OLDBOFF. The default is OLDBOFF=62 and OLDBENT=13.

If your installation uses part of the DS1SYSCD field for a purpose other than ABR OLDBACKUP information, then you may specify a remaining part of this field for use by ABR, the rule being that the sum of OLDBOFF and OLDBENT must not exceed 75. When using FDRZAPOP, since the value of OLDBENT is evaluated in conjunction with the value of OLDBOFF, the user should specify both values on the same ZAP statement to reduce the chance of error. For example, if the first 8 bytes of DS1SYSCD are in use, you can use the last 5 bytes by ZAP OLDBOFF=70,OLDBENT=5

**CAUTION:** If you change the values for OLDBOFF or OLDBENT after you have enabled any volumes for OLDBKUP, you must immediately use the MAINT command of program FDRABRM to convert all disk volumes on which OLDBKUP is enabled to reflect the new OLDBACKUP field, as described in [Section 55.04](#). Otherwise, ABR will lose track of any existing OLDBACKUP entries.

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**OLDBACKUP OPTIONS**  
(Continued) **New users:** INNOVATION strongly recommends that you do not change the default values for OLDBENT and OLDBOFF unless your installation already uses part of DS1SYSCD for some other purpose.

**Existing users:** If your installation is currently using OLDBOFF values other than 62 through 73, then INNOVATION strongly recommends that you change to OLDBOFF=62,OLDBENT=13 as described above and then use the MAINT command of program FDRABRM to convert all disk volumes to reflect the new OLDBACKUP field, as described in [Section 55.04](#). If you must use another field, be sure that the OLDBOFF/OLDBENT fields are set properly when installing new versions of ABR; the COPY command of ISPF panel A.I.4 will copy options from an earlier release.

**CYCLE** Specifies the default value for CYCLE (auto-cycles) to be used with the ABRINIT and REMODEL commands of FDRABRM and with ISPF panel A.I.8. Default is 10. Specify ZAP CYCLE=nn (1 to 63) to change. Can be overridden at execution.

**GEN** Specifies the default value for GEN (maximum generations to keep) to be used with the ABRINIT and REMODEL commands of FDRABRM and with ISPF panel A.I.8. Default is 4. Specify ZAP GEN=nn (1 to 1000) to change. Can be overridden at execution.

**RETPD** Specifies the default value for RETPD (default retention of full-vol backups) to be used with the ABRINIT and REMODEL commands of FDRABRM and with ISPF panel A.I.8. Default is 60. Specify ZAP RETPD=nnnn (1 to 9999) to change. Can be overridden at execution.

**FORCE** Allows the ABRINIT command of FDRABRM and ISPF panel A.I.8 to initialize volumes for ABR processing even if some Format 1 DSCBs have non-zero data in the reserved bytes 103-104 used by ABR. Specify ZAP FORCE to enable, ZAP NOFORCE to disable. Default is NOFORCE.

**MDLRESV** Causes all functions of FDRABRM and ISPF panel A.I.8 to protect the VTOC with a RESERVE during update operations. Specify ZAP MDLRESV=YES to enable, ZAP MDLRESV=NO to disable. Default is MDLRESV=YES. Innovation recommends that you do not change this option to avoid VTOC corruption.

**CSLREF** Causes the ABRINIT and MAINT commands of FDRABRM and ISPF panel A.I.8 to set the last reference date on any data set with a zero LRDATE to today's date. Specify ZAP CSLREF to enable, ZAP NOCSLREF to disable. Default is NOCSLREF. Can be overridden at execution.

**LIST** Causes all functions of FDRABRM and ISPF panel A.I.8 to list the names of all datasets changed by the function. Specify ZAP LIST=YES to enable, ZAP LIST=NO to disable. Default is LIST=NO. Can be overridden at execution.

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**91.04 CONTINUED . . .****MORE ABR  
GENERAL  
OPTIONS  
(PANEL A.I.4.8)**

Here are a few more options used by ABR and FDRABRM. If using the ISPF dialogs, they can also be changed on panel A.I.4.8.

**ARCHI** This is the default value for the high-allocation threshold used by ARCHIVE and SUPERSCRATCH if THRESHOLD=HIGH ([See Section 51.03](#)). This threshold is stored in the ABR model, so this is the default used by FDRABRM and panel A.I.8 (although it can be overridden). This default is also used by ABR for volumes on which a threshold has never been set. Default is 80. Change it with ZAP ARCHI=nn (00 to 99).

**ARCLOW** This is the default value for the low-allocation threshold used by ARCHIVE and SUPERSCRATCH if THRESHOLD=LOW ([See Section 51.03](#)). This threshold is stored in the ABR model, so this is the default used by FDRABRM and panel A.I.8 (although it can be overridden). This default is also used by ABR for volumes on which a threshold has never been set. Default is 80. Change it with ZAP ARCLOW=nn (00 to 99).

**OPTIONS FOR  
EXITS**

Other options relate to the ABR system exits.

ISPF panel A.I.4.11.1 contains options for the dynamic installation of the exits. They are explained in [Section 92.51](#).

ISPF panels A.I.4.11.2 and A.I.4.11.3 contain options relating to the CATALOG LOCATE exit for auto-recall. They are explained in [Section 52.24](#).

ISPF panel A.I.4.11.5 contains options relating to the DADSM pre-processing exit. They are explained in [Section 92.60](#).

**91.05 ABR PROTECT LISTS AND RESTORE ALLOCATION CONTROL LIST**

**ABR PROTECT LISTS** ABR supports lists of data sets to be protected from ARCHIVE, Incremental Backup, RESTORE, or SUPERSCRATCH operations. To maintain the ABR Protect Lists you can use either ISPF panel A.I.6, or program FDRZAPOP.

Name and Use of List	Module	ISPF Option	FDRZAPOP Option	FDRZAPOP Command
ABR ARCHIVE Protect List – used for DUMP TYPE=ARC	FDRPROTA	A.I.6.2	ARCPROT	PROTECT
ABR Incremental Backup Exclude List – used for DUMP TYPE=ABR/AUTO	FDRPROTD	A.I.6.3	ABRPROT	EXCLUDE
ABR RESTORE Protect List – used for RESTORE TYPE=ABR/ARC	FDRPROTR	A.I.6.4	RESTPROT	RESTPROT
ABR SUPERSCRATCH Protect List – used for DUMP TYPE=SCR	FDRPROTS	A.I.6.5	SCRPROT	SCREXCL
<p>"Module" is the name of the load module containing this list in the FDR program library. This is also the name of the source module in the Installation Control Library that can be used to increase the size of the list.</p> <p>"ISPF Option" is the option number for maintaining this list on ISPF panel A.I.6.</p> <p>"FDRZAPOP Option" is the value for the ENABLE or DISABLE operand of the ZAP command, and the operand for the PRINT and RESET commands, under program FDRZAPOP. This is also the name of the member in the Installation Control Library that is the recommended location for storing the external form of the list, if you are maintaining the lists with FDRZAPOP.</p> <p>"FDRZAPOP Command" is the command for adding entries to this list with program FDRZAPOP.</p>				

FDR NOTE: The Protect Lists are supported only by ABR data set operations. Programs FDR, FDRDSF, and FDRCOPY do not support this option. Full volume dumps and restores (DUMP/RESTORE TYPE=FDR) under program FDRABR ignore the Protect Lists.

**ENABLING ABR PROTECT LISTS** The ABR Protect Lists can be enabled or disabled independently of one another. To enable a Protect List, specify YES for the ACTIVE option for that list on ISPF panel A.I.6, or execute program FDRZAPOP with the command ZAP ENABLE=Option, where Option is ARCPROT, ABRPROT, RESTPROT, or SCRPROT. To disable a Protect List, specify NO for the ACTIVE option for that list on ISPF panel A.I.6, or use the command ZAP DISABLE=Option.

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## 91.05 CONTINUED . . .

**MAINTAINING  
ABR PROTECT  
LISTS**

If you maintain the ABR Protect Lists using the ISPF dialog, you start by selecting a particular list by number (2 through 5) on the ISPF panel FDR INSTALLATION--ABR PROTECT LISTS AND RESTORE ALLOCATION LIST (option A.I.6), as shown in [Section 92.05](#), Step 6A. When the list is displayed, you add or delete entries by using line commands (I -- insert; D -- delete; R -- repeat) and filling in the applicable fields. A Find command is also available. When installing a new release, either display each list with panel A.I.6 and use the COPY command under the dialog to copy your installation's Protect List from the prior release; or use ISPF COPY (option 3.3) or IEBCOPY to copy modules FDRPROTA, FDRPROTD, FDRPROTR, and FDRPROTS from the program library for the previous release.

If you maintain the ABR Protect Lists using program FDRZAPOP, each list should exist in two forms: an external form and an internal form. The external form of the list consists of input to FDRZAPOP. This external form can be stored anywhere, but the recommended locations are members ARCPROT, ABRPROT, RESTPROT, and SCRPROT on the Installation Control Library. You add or delete entries by editing the PROTECT, EXCLUDE, RESTPROT, or SCREXCL commands (See Below) in the external form of the list, using ISPF EDIT or any other editor, and then using this external form as the SYSIN input to program FDRZAPOP. When FDRZAPOP processes this input, FDRZAPOP builds the internal form of the Protect List, which is stored in load module FDRPROTA, FDRPROTD, FDRPROTR, or FDRPROTS on the FDR program library and is used at execution time. When installing a new release, use the external form as input to FDRZAPOP. If you are storing the external form as a member of the Installation Control Library, as recommended, copy that member to the Installation Control Library for the new release.

The following is the format of the commands used to add entries to the ABR Protect Lists when using program FDRZAPOP:

**PROTECT** | **EXCLUDE** | **RESTPROT** | **SCREXCL**  
**DSN=filter** | **ALLDSN**  
**,VOL=volser** | **,VOLG=volgroup** | **,ALLVOL**

**PROTECT  
COMMAND**

Specifies that these data sets are to be added to the Protect List to be used during an ABR ARCHIVE dump operation (DUMP TYPE=ARC). These data sets will never be eligible for ARCHIVE.

**EXCLUDE  
COMMAND**

Specifies that these data sets are to be added to the EXCLUDE list to be used during an ABR Incremental Backup operation (DUMP TYPE=ABR/AUTO). These data sets will never be dumped during an ABR Incremental Backup operation. They will be included in full volume backups, and they will be eligible to be backed up under DUMP TYPE=DSF if requested by SELECT commands.

WARNING: If data sets are excluded from incremental backups, an ABR full volume restore from the incremental backups will not restore those data sets to the most current level, unless they have been unchanged since the full volume backup at the beginning of the generation.

**RESTPROT  
COMMAND**

Specifies that these data sets are to be added to the Protect List to be used during an ABR data set or ARCHIVE RESTORE operation (RESTORE TYPE=ABR/ARC). These data sets can never be restored, except in a full volume restore.

**SCREXCL  
COMMAND**

Specifies that these data sets are to be added to the Protect List to be used during an ABR SUPERSCRATCH operation (DUMP TYPE=SCR). These data sets will never be eligible for SUPERSCRATCH operations.

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## 91.05 CONTINUED . . .

**OPERANDS DSN=** Specifies a fully-qualified data set name (up to 44 characters) or a filter to be used for generic data set protection, as described in [Section 52.16](#).

EXAMPLES: DSN=USER1.JCL.CNTL  
 DSN=\*\*LI ST  
 DSN=PROD++. \*\*. LI B\*

NOTE: the DSG= operand documented in previous versions of ABR is still accepted, but the DSN= operand with a generic data set name filter is the preferred way to protecting groups of data sets.

**ALLDSN** Specifies that all the data sets on the volume(s) indicated are to be protected. If VOL/VOLG is not specified, ABR will not be able to perform this function on any volume in the system.

EXAMPLE: SCREXCL ALLDSN will disable SUPERSCRATCH.

**VOL=** Specifies the disk volume serial number on which these data sets are to be protected. From 1 to 6 characters may be specified.

**VOLG=** Specifies a group of disk volumes (all starting with the specified prefix) on which these data sets are to be protected. From 1 to 5 characters may be specified.

**ALLVOL** Specifies that these data sets are to be protected on any volume.  
 Default is all volumes.

NOTE: VOL, VOLG, and ALLVOL are mutually exclusive.

**PRINTING AND  
RESETTING**

To print the entries currently in the internal form of an ABR Protect List, execute program FDRZAPOP with the command PRINT Option, where Option is ARCPROT, ABRPROT, RESTPROT, or SCRPROT.

To reset the internal form of an ABR Protect List to be empty, display the list with ISPF panel A.I.6 and use the RESET command under the dialog, or execute program FDRZAPOP with the command RESET Option, where Option is ARCPROT, ABRPROT, RESTPROT, or SCRPROT. If you maintain the ABR Protect Lists using program FDRZAPOP, the RESET Option command should always be the first command in the external form of the list, in order to remove the previous contents when you recreate the list.

**EXPANDING  
ABR PROTECT  
LISTS**

The maximum number of entries in each ABR Protect List is 100. The ISPF dialog or program FDRZAPOP will notify the user if the table is full. Members FDRPROTA, FDRPROTD, FDRPROTR, and FDRPROTS on the Installation Control Library contain the source code for the internal form of the Protect Lists, along with the JCL that can be used to assemble and linkedit the load modules in case you need to expand them.

If the total number of control statements in one execution of FDRABR, including those from the Protect List, exceeds 100, then MAXCARDS= must be specified on the DUMP or RESTORE command.

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## 91.05 CONTINUED . . .

**RESTORE  
ALLOCATION  
CONTROL LIST**

The ABR RESTORE Allocation Control List (module FDRALLOC) gives you the capability to specify installation-wide rules for how ABR will allocate data sets if the original volume or requested new volume is not ONLINE or is full.

If enabled, the ABR RESTORE Allocation Control List will be applied to any RESTORE from ABR backup or from ARCHIVE, requested either through program FDRABR in a batch job or through Automatic Recall, if the initial attempt at allocation fails. ABR will always choose an initial target volume by the rules in Sections 50.08 (backup) and 51.06 (ARCHIVE); for auto-recall, the reply to message FDRW77 by a TSO user or the LXCONUSE option may affect that choice. If the data set exists on that target volume, ABR may simply overlay it (auto-recall will fail in this case). Because of this, most restores from backup will not use the RESTORE allocation list unless you are restoring a scratched data set.

If the data set does not exist on the target disk, ABR will try to allocate it (in a system with SMS, SMS may assign the data set to a different volume; SMS considerations are in [Section 52.50](#)). If the target volume is not currently ONLINE or contains insufficient space for the data set, or if the allocation fails for any reason, ABR will scan the RESTORE Allocation Control List. The control statements are scanned in the sequence in which they appear in the list. If a match is made, on data set name and optionally the original volume serial, ABR will use the volumes specified by the NVOL/NVOLG operand to allocate the data set. ABR will use only the first control statement which matched. If the data set does not match any of the ALLOCATE control statements, an error message will be issued reflecting the allocation failure.

ABR will attempt the allocation using the volumes specified in the NVOL/NVOLG operand, in the order that the Unit Control Blocks (UCBs) for those volumes appear within the Operating System (device address order, not the order that the volumes appears in the NVOL operand). In the case of a batch ABR restore, if the NVOL operand was also present on the SELECT statement which caused this data set to be restored, ABR will merge the NVOL/NVOLG lists from the SELECT and matching ALLOCATE statement, in UCB order, except that the first volume on the SELECT will be the initial target volume. ABR will bypass a specified volume if it is not currently ONLINE. If ABR is unable to allocate the data set on any of the specified disk volumes, an error message will be issued reflecting the allocation failure on the first volume tried.

If possible, NVOL/NVOLG should specify disk volumes which are the same type as the original disk volumes (e.g., 3380 or 3390, a "like" device type). If not you can specify a mixture of like and unlike disks (ABR will try the like devices first) or totally unlike disks. If ABR must restore to an unlike disk, there are some restrictions and considerations as described in [Sections 52.14](#) and [52.15](#).

**ENABLING  
RESTORE  
ALLOCATION  
LIST**

To enable the ABR RESTORE Allocation Control List, specify YES for the ACTIVE option on the line for RESTORE ALLOCATION LIST on ISPF panel A.I.6, or execute program FDRZAPOP with the command ZAP ENABLE=ALLOCATE. To disable the ABR RESTORE Allocation Control List, specify NO for the ACTIVE option on the line for RESTORE ALLOCATION LIST on the panel, or use the command ZAP DISABLE=ALLOCATE.

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## 91.05 CONTINUED . . .

**MAINTAINING  
RESTORE  
ALLOCATION  
LIST**

To maintain the ABR RESTORE Allocation Control List, you can use either ISPF panel A.I.6, or program FDRZAPOP.

If you maintain the ABR RESTORE Allocation Control List using the ISPF dialog, you start by selecting option 1 on the ISPF panel FDR INSTALLATION--ABR PROTECT LISTS AND RESTORE ALLOCATION LIST (option A.I.6), as shown in [Section 92.05](#), Step 6A. When the list is displayed, you add or delete entries by using line commands (I -- insert; D -- delete; R -- repeat) and by entering ALLOCATE commands in the format shown below. A Find command is also available. When installing a new release, either display the list with panel A.I.6 and use the COPY command under the dialog to copy your installation's list from the prior release; or use ISPF COPY (option 3.3) or IEBCOPY to copy module FDRALLOC from the program library for the previous release.

If you maintain the ABR RESTORE Allocation Control List using program FDRZAPOP, the list should exist in two forms: an external form and an internal form. The external form of the list consists of input to FDRZAPOP. This external form can be stored anywhere, but the recommended location is the member ALLOCATE on the Installation Control Library. You add or delete entries by editing the ALLOCATE commands (See Below) in the external form of the list, using ISPF EDIT or any other editor, and then using this external form as the SYSIN input to program FDRZAPOP. When FDRZAPOP processes this input, FDRZAPOP builds the internal form of the ABR RESTORE Allocation Control List, which is stored in load module FDRALLOC on the FDR program library and is used at execution time. When installing a new release, use the external form as input to FDRZAPOP. If you are storing the external form as a member of the Installation Control Library, as recommended, copy that member to the Installation Control Library for the new release.

The format of the ALLOCATE command is:

**ALLOCATE**    *DSN=dsname | ALLDSN*  
                   *,VOL=(volser1,...,volsern) | ,VOLG=volgroup*  
                   *,NVOL=(newvolser1,...,newvolsern) | ,NVOLG=newvolgroup*

**OPERANDS**    **DSN=**    Specifies a fully-qualified data set name (up to 44 characters) or a filter to be used for generic data set selection, as described in [Section 52.16](#).

EXAMPLES: DSN=USER1. JCL. CNTL  
               DSN=\*\*LI ST  
               DSN=PROD+ . \*\* . LI B\*

NOTE: The DSG= operand documented in previous versions of ABR is still accepted, but the DSN= operand with a generic data set name filter is the preferred way to selecting groups of data sets.

**ALLDSN**    Specifies that all the data sets dumped from the volumes indicated are to be selected. If VOL/VOLG is not specified, the command applies to all data sets (except those selected by previous ALLOCATE commands).

EXAMPLE: ALLOCATE ALLDSN,NVOLG=RESTR specifies that all data sets that cannot be restored to their target volumes should be restored to the RESTRx pool.

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**91.05 CONTINUED . . .**

- VOL=** Specifies the disk volume serial numbers from which these data sets may have been dumped. From 1 to 6 characters may be specified. A maximum of 255 volumes may be specified.
- VOLG=** Specifies a group of disk volumes (all starting with the specified prefix) from which these data sets may have been dumped. From 1 to 5 characters may be specified. Only one volume group may be specified on this statement.
- The default if VOL or VOLG is not specified, is that the data set may have been dumped from any volume.
- NVOL=** Specifies the new volume serials to be used in place of the target volume, if the target is not online or is full at the time of the restore. From 1 to 255 volumes may be specified.
- NVOLG=** Specifies a new volume group (all starting with the specified prefix) to be used in place of the target volume, if the target volume is not online or is full at the time of the restore. Only one new volume group may be specified on this statement.
- NOTE: NVOL and NVOLG are mutually exclusive. One and only one NVOL or NVOLG operand must be specified on every ALLOCATE command.

**PRINTING AND  
RESETTING** To print the entries currently in the internal form of the ABR RESTORE Allocation Control List, execute program FDRZAPOP with the command PRINT ALLOCATE.

To reset the internal form of the ABR RESTORE Allocation Control List to be empty, display the list with ISPF panel A.I.6 and use the RESET command under the dialog, or execute program FDRZAPOP with the command RESET ALLOCATE. If you maintain the ABR RESTORE Allocation Control List using program FDRZAPOP, the RESET ALLOCATE command should always be the first command in the external form of the list, in order to remove the previous contents when you recreate the list.

**EXPANDING  
RESTORE  
ALLOCATION  
LIST** The maximum number of entries in the ABR RESTORE Allocation Control List is 100. The ISPF dialog or program FDRZAPOP will notify the user if the table is full. Member FDRALLOC on the Installation Control Library contains the source code for the internal form of the ABR RESTORE Allocation Control List, along with the JCL that can be used to assemble and linkedit the load module in case you need to expand it.

If the total number of control statements in one RESTORE, including those from the ABR RESTORE Protect List and those from the ABR RESTORE Allocation Control List, exceeds 100, then MAXCARDS= must be specified on the RESTORE command. Exception: For automatic recall, up to 255 statements can be accommodated; contact INNOVATION if you exceed 255 statements for auto-recall.

## 91.06 FDR DATA SET SECURITY OPTIONS

**ENABLING OR  
DISABLING  
DATA SET  
SECURITY**

The FDR system supports several different types of security, including RACF and PASSWORD protection, user exits, and other special options. **The programs in the FDR system, as a default, will not invoke any type of security when dumping or restoring data sets or volumes. Since FDR does not open individual datasets, most security checks will be bypassed for FDR operations unless you enable the options appropriate for your installation.**

**RECOMMENDATIONS:**

If your installation has RACF, and uses any generic profiles, enable the ALLCALL option.

If your installation has RACF, and uses only discrete profiles, enable the RACF option.

If your installation has TOP SECRET, enable the ALLCALL option.

If your installation has RACF or TOP SECRET, and you have VSAM clusters that are protected by discrete profiles, enable the VSAMPASS option.

If your installation has ACF2, enable the ALLCALL option. Consult the ACF2 "Other Products" and "SAF" manuals or contact Computer Associates for current information on enabling the ACF2 SAF interface to process RACROUTE calls from FDR. Note: the FDR security exits, FDRYOPEN and FDRYPASS, provided by ACF2, are no longer used for FDR security; if currently in use, you should disable them and convert to ALLCALL/SAF.

The following options can be enabled or disabled via the ISPF panel FDR INSTALLATION--SET FDR GLOBAL SECURITY OPTIONS (option A.I.4.1), or by executing program FDRZAPOP with the command ZAP ENABLE=option or ZAP DISABLE=option.

**ALLCALL**

This option specifies that a RACROUTE REQUEST=AUTH is to be used for both full volume protection and data set protection. The level of authority required (READ, UPDATE, or ALTER) depends on the function being executed. For data set protection, authorization will be checked for every data set that is to be processed, regardless of whether the data set is marked with the RACF protection indicator (the X '40' bit in the DS1DSIND byte). ALLCALL should be enabled rather than RACF if any generic profiles are being used. In many cases, FDR checks for a volume profile (CLASS='DASDVOL' and ENTITY='volser') to see if the user is authorized to the entire volume. Since this usually causes checks on individual data sets to be bypassed, the security overhead can be reduced for users who do full-volume operations or general ABR incremental backups or ARCHIVES. In the case when data set checks will be issued if the DASDVOL check fails, the DASDVOL check is issued with a parameter (LOG=NOFAIL) which suppresses any error messages or logging associated with the DASDVOL check, since they could erroneously be interpreted as a security violation. If you use the GDASDVOL resource grouping class, SETROPTS RACLIST(DASDVOL) must be in effect.

For TOP SECRET and ACF2, consult vendor documentation for instructions on implementing DASDVOL class profiles.

**DUMP****TYPE=FDR**

FDR will check for a volume profile (RACROUTE CLASS='DASDVOL'). The requested access authority is READ. If a DASDVOL profile does not exist for the volume, or the user is not authorized under the DASDVOL profile, FDR will issue a RACROUTE for each data set on the volume. The requested access authority is READ. If the user is not authorized to read every data set on the volume, the entire operation will be terminated.

**RESTORE****TYPE=FDR**

FDR will check for a volume profile for the volume being restored to (RACROUTE CLASS='DASDVOL'). The requested access authority is ALTER. If a DASDVOL profile exists for that volume, and the user is not authorized to alter the volume, the restore will be terminated. No individual data set checking is performed. The user's authority to read the disk volume that was backed up is checked by OPENing the backup file. We recommend that backup tapes should be protected, preferably with program pathing (that is, only a user who is authorized to read a disk volume, should be authorized to read the backup tapes created from that disk volume, and the only programs with which he should be able to read those tapes are FDRxxxxx programs).

**COPY****TYPE=FDR**

FDR will perform the same checks as DUMP on the volume being copied from and the same checks as RESTORE on the volume being copied to.

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## 91.06 CONTINUED . . .

**ALLCALL**  
(continued) **COMPAKTOR**  
**COMPAKT**  
or **RELEASE**

COMPAKTOR will check for a volume profile for the volume being COMPAKTed onto, or RELEASEd (RACROUTE/RACHECK CLASS='DASDVOL'). The requested access authority is ALTER. If a DASDVOL profile exists for that volume, and the user is not authorized to alter the volume, the operation will be terminated. No individual data set checking is performed by COMPAKTOR. In addition, if DUMP=YES is specified or COMPAKTOR is running under FDR or ABR, FDR will perform the checks described above for DUMP TYPE=FDR.

**ABSOLUTE**  
**TRACK**

FROM/TO operands -- FDR will check for a volume profile (RACROUTE CLASS='DASDVOL'). The requested access authority is READ for DUMP and PRINT and for the input volume on COPY; the requested access authority is ALTER for RESTORE and for the output volume on COPY. If a DASDVOL profile exists for the volume being accessed, and the user does not have the requested access authority, the operation will be terminated. FDR does not attempt to determine what data sets the requested tracks belong to, or to perform checking at the data set level.

If the installation considers that this approach does not provide adequate security, then absolute track operations can be disabled completely, as discussed under "Disable Absolute TrackÓ, later in this Section.

**DUMP**  
**TYPE=DSF/**  
**ABR/AUTO**

FDR will check for a volume profile (RACROUTE CLASS='DASDVOL') The requested access authority is READ. If a DASDVOL profile does not exist for the volume, or the user is not authorized under the DASDVOL profile, FDR will issue a RACROUTE for each data set that is selected to be dumped. If the user is not authorized to read a particular data set, that data set will be bypassed.

**DUMP**  
**TYPE=ARC/**  
**SCR**

ARCHIVE and SUPERSCRATCH -- FDR will do the same checks as for DUMP TYPE=DSF/ABR/AUTO, except that the requested access authority is ALTER. However, for DUMP TYPE=ARC with SCRATCH=NO (application backup), the requested access authority is READ.

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## 91.06 CONTINUED . . .

**ALLCALL** **RESTORE**  
**(continued)** **TYPE=DSF/**  
**ABR/ARC TO**  
**SAME NAME**

FDR will check for a volume profile for the output volume (RACROUTE CLASS='DASDVOL'). The requested access authority is UPDATE.

If a data set being restored does not exist on disk before the restore, then FDR will request the Operating System to create the data set. The Operating System will check for security at the data set level, whether or not the user has DASDVOL authority, and regardless of what security options the installation has activated within FDR. FDR considers that if the user is authorized to create the data set, he must be authorized to write to it; therefore FDR will not issue a RACROUTE for the data set if its creation is successful.

If a data set being restored does exist on disk before the restore, and a DASDVOL profile does not exist for the volume, or the user is not authorized under the DASDVOL profile, then FDR will issue RACROUTE for the output data set. The requested access authority is UPDATE.

If a particular data set fails the security checks, that data set will be bypassed, and other requested data sets may still be restored.

If the restore is an automatic recall, then additional options are available to modify the security checks. For details, [See Section 52.20](#).

**RESTORE**  
**TYPE=DSF/**  
**ABR/ARC TO**  
**NEW NAME**

FDR will issue a RACROUTE for the original dsname on the original volume serial. The requested access authority is READ. If the user is not authorized to the original name or the profile no longer exists, FDR will not restore the data set. Other data sets requested in the same run will still be restored. The reason why FDR fails the restore if there is no profile for the original dsname (return code 4 from RACROUTE/RACHECK) is that it is possible that the data set was protected by a profile at the time it was backed up, and that the user running the restore would not have been authorized under that profile, but the profile has since been deleted. At the time of the restore, FDR does not know whether the data set was protected at the time of the backup. However, this means that if a dataset has never been protected, FDR will not allow anyone to restore it to a new name; if you have unprotected datasets in your installation, contact Innovation for assistance.

No checking is done for a DASDVOL profile for the volume from which the data set was backed up; so if the user has authority under a DASDVOL profile for the original volume, he must still have to have authority under a data set profile for the original dsname in order to restore the data set to a new name.

If the user is authorized to read the original data set name, FDR will check security for the output volume and the new-name output data set as specified above for restores to the same name.

**COPY/MOVE**  
**TYPE=DSF**

FDRCOPY – The input volume and input data sets will be checked as described above for DUMP TYPE=DSF/ABR/AUTO. The output volume and output data sets will be checked as described above for RESTORE TYPE=DSF/ABR/ARC. On a COPY or MOVE to a new name, the input data set is checked according to the rules for DUMP, and not according to the rules for RESTORE. That is, if the user has READ authority under a DASDVOL profile for the input volume, security will not be checked at the data set level; and if security is checked at the data set level, but no data set profile exists, the operation will proceed. The reason why COPY or MOVE does not require a profile for the original data set is that while on a restore the original data set and its profile may both have been deleted, on a COPY or MOVE the original data set must still exist on disk, and its security status can be definitely determined.

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## 91.06 CONTINUED . . .

**ALLCALL** **REMOTE**  
**(continued)** **QUEUE**  
**BACKUP or**  
**ARCHIVE**

If DISKUPDATE=YES is in effect ([See Section 91.04](#)), then the Remote Queue Utility or the ABR ISPF dialog, before setting the Update indicator or ARCHIVE indicator in the DSCB, will check for a volume profile (RACROUTE CLASS='DASDVOL'). The requested access authority is READ if all of the commands for a given volume are BACKUP or RESET BACKUP, or ALTER if at least one of the commands for the volume is ARCHIVE or RESET ARCHIVE. If a DASDVOL profile does not exist for the volume, or the user is not authorized under the DASDVOL profile, then a RACROUTE for each data set that is selected will be issued. The requested access authority is READ if the command for that data set is BACKUP or RESET BACKUP, or ALTER if the command for that data set is ARCHIVE or RESET ARCHIVE.

If DISKUPDATE=NO is in effect, then the Remote Queue Utility or the ABR ISPF dialog, before adding the request to the Remote Queue data set, will not check for a volume profile, but will issue a RACROUTE for each data set that is requested to be processed. The requested access authority is READ if the command for that data set is BACKUP or RESET BACKUP, or ALTER if the command for that data set is ARCHIVE or RESET ARCHIVE. If the requested data set is not cataloged and VOL is not specified, then the RACROUTE/RACHECK will be issued with a dummy volume serial of 'DUMMYV'. The DSG and VOLG parameters are considered invalid if DISKUPDATE=NO is in effect.

If a particular data set fails the security checks, that data set will be bypassed, and other requested data sets may still be processed.

**REMOTE**  
**QUEUE**  
**RESTORE**

Remote Queue RESTORE requests are always processed by adding the request to the Remote Queue data set. The Remote Queue Utility or the ABR ISPF dialog, before adding the request to the Remote Queue data set, will not check for a volume profile, but will issue a RACROUTE for each data set that is requested to be restored. If the restore is to the original dsname on the original volume serial, the requested access authority is READ. If the user specified a new name or a new volume serial, RACROUTE will be issued for both the new data set and the original data set. The requested access authority is ALTER for the new data set and READ for the original data set. If a profile exists for the new data set, then FDR will require that a profile exist for the original data set also. If the requested original data set is not cataloged and VOL is not specified, or if the requested new data set is not cataloged and NVOL is not specified, then the RACROUTE will be issued with a dummy volume serial of 'DUMMYV'. The DSG and VOLG parameters are considered invalid.

If a particular data set fails the security checks, that data set will be bypassed, and other requested data sets will still be processed.

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**91.06 CONTINUED . . .**

**RACF** This option specifies that the RACROUTE macro with REQUEST=AUTH is to be used for both full volume protection and data set protection. FDR will perform all of the checking listed above for the ALLCALL option, except that for data set protection, the RACROUTE will only be issued if the data set is marked with the RACF protection indicator (the X '40' bit in the DS1DSIND byte). The RACF option should be specified only if NO generic profiles are being used.

If the RACF option is enabled, FDR will not restore or copy or move a protected data set to a non-protected output data set that exists on disk before the restore or copy or move, and vice-versa.

In the Remote Queue Utility or under the ABR ISPF dialogs, for BACKUP or ARCHIVE requests, if DISKUPDATE=NO is in effect: if the requested data set is not cataloged, then VOL must be specified.

In the Remote Queue Utility or under the ABR ISPF dialogs, for RESTORE requests, if the original data set is not cataloged, then VOL must be specified. If a new name is specified, and the new data set name is not cataloged, then NVOL must be specified.

RACF processing is separate from the PASSWORD option. If the user requires both RACF and PASSWORD processing, both must be enabled. However, if a particular data set has both RACF and password indicators, then only RACF checking will be done.

**PASSWORD** This option specifies that all data sets (except VSAM) selected during a full volume backup or data set dump or restore, that are protected by OS passwords (X '10' flag in the DS1DSIND field in the DSCB of the dataset, and the passwords stored in the "PASSWORD" dataset) are OPENed to establish processing authority prior to performing the requested function. The operators may have to reply with the proper password. There is no password processing during FDR full volume restore.

FDR will not restore a protected data set to a non-protected data set, and vice-versa. A PASSWORD protected data set cannot be restored to a newname.

PASSWORD processing is entirely separate from the RACF option. If the user requires both RACF and PASSWORD processing, both must be enabled. However, password protection, while still supported by MVS, is rarely used, so do not enable this option unless you truly require it.

NOTE: The use of this option will cause the Last Reference Date to be set to today's date for all data sets OPENed, which will defeat ARCHIVING by ADAYS.

CONTINUED . . .

**91.06 CONTINUED . . .**

**VSAMPASS** This option specifies that selected VSAM data sets will be OPENed prior to performing the requested function. VSAM data sets always have the password bit on in the DSCB, but the actual protection status is recorded only in the catalog. During OPEN, the Operating System will determine whether the data set is protected, and if so whether the user is authorized. The type of protection may be RACF, PASSWORD, or VSAM user exit. If the clusters are protected by VSAM passwords (specified during DEFINE and stored in the catalog), the operators may need to reply with the proper password.

A JOBCAT or STEPCAT DD statement must be supplied, for each catalog needed for the data set(s) which are not aliased in the master catalog.

If VSAMPASS is enabled, a VSAM data set cannot be restored to a NEWNAME.

NOTE: The use of this option will cause the Last Reference Date to be set to today's date for all data sets OPENed, which will defeat ARCHIVING by ADAYS.

If you have VSAM clusters protected by RACF discrete profiles, you must enable the VSAMPASS option to cause security checking to be done for them; the RACF or ALLCALL options are not sufficient. However, if your VSAM data sets are protected strictly by generic profiles, the ALLCALL option will cause proper security checking for all data set types; VSAMPASS is not required (even if VSAMPASS is enabled, the OPEN will not be done on any cluster protected by a generic profile).

On a restore, if a VSAM data set does not already exist and FDR does a DEFINE for it, the data set will not be marked in the catalog as being protected by a password or by a discrete RACF profile, regardless of whether the VSAMPASS option is enabled. If the data set is supposed to have these characteristics, the user should reestablish them; [See Section 52.11](#) for details. This consideration does not apply to VSAM data sets protected by generic RACF profiles; they will automatically be protected after a restore.

**FDRPASS** This option specifies the Simplified Volume Protection feature. During full volume (TYPE=FDR) DUMP, COPY or RESTORE processing, FDR will scan the volume for a single PASSWORD or RACF protected data set with a data set name which begins with the character string 'FDR.PASSWORD'.

Simplified Volume Protection is intended to be used in conjunction with the PASSWORD option. On data set operations the passwords will be checked for the individual data sets being processed, and on full volume operations the password will be checked only for the FDR.PASSWORD.xxxxxx data set. Simplified Volume Protection can also be used in conjunction with the RACF and ALLCALL option, but similar results can be obtained simply by creating an appropriate volume (DASDVOL) profile. If none of the options PASSWORD, RACF, or ALLCALL are enabled, FDRPASS will be ignored.

To use Simplified Volume Protection, you must create a unique FDR.PASSWORD.xxxxxx data set on each volume you wish to protect, to provide a means of relating ownership to the individual volumes. This data set need not be a physical data set. It is recommended that a model DSCB be used for this purpose. If the data set is not present, no security check will be done on the volume.

NOTE: Simplified Volume Protection is not used during data set (DSF or ABR) operations.

CONTINUED . . .

**91.06 CONTINUED. . .**

**OPENALL** This option specifies that all selected data sets will be OPENed to establish processing authority prior to performing the requested function. Selection criteria are as follows:

Full Volume DUMP – all data sets in VTOC will be OPENed.

Full Volume RESTORE – NO EFFECT.

Data Set DUMP/RESTORE – all data sets selected will be OPENed.

A JOBCAT or STEPCAT DD statement must be supplied, for each catalog needed for VSAM data sets which are not aliased in the master catalog.

NOTE: The use of this option will cause the Last Reference Date to be set to today's date for all data sets OPENed, which will defeat ARCHIVING by ADAYS.

**OTHER  
SECURITY  
CONSID-  
ERATIONS**

Backup tapes should be protected, preferably with program pathing.

The ABR Remote Queue data sets should be protected with program pathing.

Security considerations for Automatic Recall (ABR CATALOG LOCATE exit and Data Set Not Found exit) are discussed in [Section 52.25](#).

When the ABR DADSM Pre-processing exit (or the old ABR SCRATCH exit) is installed, all users must be authorized to create entries in the ABR SCRATCH catalog, i.e. they must be authorized to catalog dsnames starting with '#.'. This consideration is discussed in more detail in [Section 92.60](#).

**DISABLE NEW  
NAME**

If for some reason you wish to prevent data sets from being restored to new names, specify NO for the NONEW option on ISPF panel A.I.4.1, or execute program FDRZAPOP with the command ZAP ENABLE=NONEW. This will cause the operands NEWNAME, NEWGROUP, NEWDD and NEWINDEX to be treated as invalid (message FDR302 CONTROL STATEMENT ERROR -- REASON P). If you later wish to return to permitting data sets to be restored to new names, specify YES for the NONEW option on panel A.I.4.1, or execute program FDRZAPOP with the command ZAP DISABLE=NONEW.

**ABSOLUTE  
TRACK  
CONSID-  
ERATIONS**

Program FDRDSF will DUMP, RESTORE or PRINT physical disk tracks, and program FDRCOPY will COPY physical disk tracks, if the user specifies the Absolute Track operands (FROM and TO). FDRDSF and FDRCOPY do not attempt to determine the data set(s) in which the requested tracks reside, and security checking for data set names is bypassed.

If ALLCALL or RACF is enabled, security checking is done at the volume level. If a DASDVOL profile exists for the volume being accessed, the user must have READ authority for DUMP or PRINT or for the input volume on COPY, or ALTER authority for RESTORE or for the output volume on COPY. If no DASDVOL profile exists, then all users will be able to do absolute track operations on the volume.

The PASSWORD, VSAMPASS, FDRPASS, or OPENALL options will not cause any security checking to be done for absolute track operations.

If a Disk Volume OPEN exit is installed and enabled (OPENEXIT option), FDR notifies the exit that an absolute track operation has been requested by passing a 'Z' in the OPTIONS byte (byte 6) of the exit parameter list. If a Data Set Security exit is installed and enabled (SECEXIT option), FDR passes each requested range of absolute tracks (beginning and ending cylinder and track address) to the exit. Details are in [Section 91.10](#).

**DISABLE  
ABSOLUTE  
TRACK**

If you wish to prevent use of Absolute Track operations, specify NO for the NOABSTRK option on ISPF panel A.I.4.1, or execute program FDRZAPOP with the command ZAP ENABLE=NOABSTRK. This will cause the operands FROM and TO to be treated as invalid (message FDR302 CONTROL STATEMENT ERROR - REASON V). If you later wish to return to permitting use of Absolute Track operations, specify YES for the NOABSTRK option on panel A.I.4.1, or execute program FDRZAPOP with the command ZAP DISABLE=NOABSTRK.

## 91.07 FDRZAPOP JCL EXAMPLES

The following examples illustrate some of the ways of executing the GLOBAL OPTION CHANGE FACILITY. **All of the functions illustrated could also be performed using the ISPF dialog.**

**EXAMPLE 1** The user wishes to display the present values of the installation options for the FDR system.

```
//PRI NT      EXEC      PGM=FDRZAPOP
//SYSPRI NT   DD        SYSOUT=*
//SYSLI B     DD        DSN=fdr. l i brary, DI SP=SHR
//SYSI N      DD        *
PRI NT
```

**EXAMPLE 2** The user enables the ALLCALL option.

```
//CHANGE      EXEC      PGM=FDRZAPOP
//SYSPRI NT   DD        SYSOUT=*
//SYSLI B     DD        DSN=fdr. l i brary, DI SP=SHR
//SYSI N      DD        *
ZAP          ENABLE=ALLCALL
```

**EXAMPLE 3** Reset all of the installation options for the FDR system to their original values as supplied on the installation tape.

```
//RESET       EXEC      PGM=FDRZAPOP
//SYSPRI NT   DD        SYSOUT=*
//SYSLI B     DD        DSN=fdr. l i brary, DI SP=SHR
//SYSI N      DD        *
RESET
```

**EXAMPLE 4** The user wishes to exclude from ARCHIVE data sets whose names starts with 'MASTER' on volume group XYZ. Also all data sets with a second index level of 'PAYROLL' will be protected from SUPERSCRATCH. First the user edits member 'PROTECT' on the Installation Control Library to contain the following commands:

```
RESET      ARCPROT
PROTECT    DSN=MASTER* *, VOLG=XYZ
```

Then the user edits member 'SCREXCL' to contain:

```
RESET      SCRPROT
SCREXCL    DSN=*. PAYROLL. **
```

Then the user runs the following job:

```
//PROTECT     EXEC      PGM=FDRZAPOP
//SYSPRI NT   DD        SYSOUT=*
//SYSLI B     DD        DSN=fdr. l i brary, DI SP=SHR
//SYSI N      DD        *
ZAP          ENABLE=( ARCPROT, SCRPROT)
//           DD        DSN=fdr. l CL i brary( PROTECT ), DI SP=SHR
//           DD        DSN=fdr. l CL i brary( SCREXCL ), DI SP=SHR
```

CONTINUED . . .

## 91.07 CONTINUED...

**EXAMPLE 5** The user wishes to put two groups of data sets into the COMPAKTOR Unmovable Table. The user edits member 'CPKUNMOV' on the Installation Control Library to contain the following commands:

```

      RESET                      CPKUNMOV
      CPKUNMOV                  DSN=TMS. **
      CPKUNMOV                  DSN=DATABASE. **

```

Then the user runs the following job:

```

//CPKUNMOV    EXEC      PGM=FDRZAPOP
//SYSPRI NT   DD        SYSOUT=*
//SYSLI B     DD        DSN=fdr. l i brary, DI SP=SHR
//SYSI N      DD        DSN=fdr. l CLI i brary(CPKUNMOV) , DI SP=SHR

```





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**92.01 FDR INTERACTIVE INSTALLATION PROCEDURE**

**FDR may be installed either by using the interactive installation procedure documented here in [Section 92](#), or by following the procedures documented in [Sections 90](#) and [91](#).** This installation procedure is designed to minimize the use of JCL and to speed up the installation process; it is available for MVS systems with TSO and ISPF, for ABR user and all Trial tapes. **INNOVATION strongly recommends that you use the interactive installation procedure.**

The interactive installation procedure includes (1) a Tape Install program that dynamically allocates and loads the FDR distribution libraries from tape to disk, and (2) a series of ISPF dialogs that provide for reinstallation of the FDR distribution tape, interactive specification of the FDR Global Options and the dynamic creation of JCL streams necessary to complete the installation process.

Subsequent installation of the FDR distribution tape may be done either by the Tape Install program, or more expediently by the current version's FDR Install dialog, ISPF option A.I.1.

**Note: The FDR Install dialog (option A.I.1) has been change to accommodate the new FDR distribution tape format. This dialog may only be used instead of the Tape Install program if the field "TAPE FORMAT===>NEW" is displayed in the panel (otherwise the install job will abort with a S813 abend).** If you decide to use the FDR Install dialog, please proceed to [Section 92.04](#) after the tape is loaded.

The Tape Install program resides in file 9 of the distribution tape. It can be loaded directly from the tape for execution under TSO or ISPF, as documented in [Sections 92.02](#) and [92.03](#).

The tape volume serial "FDR52T" (used throughout this document) is that of a trial tape; the volume serial of a production tape is "FDR52P". Your FDR tape volume serial number is contained in the external tape label.

When the Tape Install program is running, PF keys serve no special purpose and are treated as the "enter" key. For example, if you execute the Tape Install program under ISPF, you cannot split the screen.

If your installation uses a tape management system, in most cases the FDR tape volume serials (FDR52T or FDR52P) are considered to be external tapes (outside of the range of serials controlled by the tape management system). If this is not the case, you can easily specify in a batch job that a tape with a serial number within the controlled range is actually an external tape, by specifying an expiration date of 98000. However, you cannot do this under TSO, because TSO validates and rejects 98000 as being an invalid Julian date. If your tape management system rejects input access to tapes that have serial numbers within its controlled range when the dsname does not match what the tape management system expects, then use the installation procedure in Step 3 of [Section 92.02](#).

**TESTING FDRREORG**

If you are interested in only testing FDRREORG, then you may use the Manual Installation Procedure.

Go to [Section 90.01A](#), Page 1310.1 for the installation instructions for FDRREORG.

**92.02 INVOKING THE TAPE INSTALL PROGRAM**

You may invoke the Tape Install program directly from tape if you have access to a TSO user id that has the "MOUNT" attribute, or if you are able to issue or request a system command on a system console to have a tape mounted. Otherwise, the Tape Install program has to be copied from tape to disk using the JCL stream documented in Step 3.

If you have access to a TSO user id that has the "MOUNT" attribute, please LOGON with that user id and proceed to Step 2. If you don't know if your LOGON id has the MOUNT attribute, proceed to Step 2 and find out.

**Step 1.**

Use this step if you are able to issue or request a system command on a system console to have a tape mounted; otherwise please proceed to Step 3.

You can access a tape from TSO, without having the MOUNT attribute, by having the operator issue a MOUNT command.

Load the FDR tape onto a tape drive \*\*\* **BEFORE** \*\*\* issuing the following system command on a system console:

**MOUNT cuu,VOL=(SL,FDR52T)**      Change "cuu" to the tape unit name.  
Change the VOL parameter to **FDR52P**  
if the tape is a production tape.

Note that this is a system operator command that can only be issued from a system console or from a TSO terminal that is simulating a system console, and not from a TSO terminal in "READY" mode or from option 6 of ISPF or under the TSO OPERATOR command.

Now go to Step 2, but remember when you are finished with the tape to issue the UNLOAD command:

**UNLOAD cuu**      Change "cuu" to the tape unit name

CONTINUED . . .

## 92.02 CONTINUED . . .

**Step 2.**

Use this step if you are logged on under a TSO user id that has the "MOUNT" attribute, or after you have completed Step 1.

Issue the following command to allocate the FDR distribution tape:

**ALLOC DA('FDR.INSTALL') VOL(FDR52T) UNIT(TAPE) POS(9) SHR**

*Change the VOL parameter to FDR52P  
if the tape is a production tape.*

*Change the UNIT parameter to  
the appropriate tape unit name.*

If you get the message "IKJ56221I DATA SET FDR.INSTALL NOT ALLOCATED, VOLUME 'NOT AVAILABLE', it is because your user id does not have the "MOUNT" attribute. Please go back to Step 1. If you have already done Step 1, then the problem is that the tape was mounted after the MOUNT command was issued. Issue an UNLOAD command: UNLOAD cuu (change "cuu" to the tape unit name); then go back to Step 1, and make sure to physically mount the tape before issuing the MOUNT command.

Now issue the following command to invoke the Tape Install program:

**LOAD 'FDR.INSTALL'**

After the tape spins down to the ninth file, the Tape Install program is loaded from the tape and begins execution.

Please skip Step 3 and proceed to [Section 92.03](#) "The Tape Install Program".

CONTINUED . . .

## 92.02 CONTINUED . . .

**Step 3.**

Use this step to submit a batch job to copy the Tape Install program to disk, and then execute it under TSO.

Submit the following job stream to the background to copy the Tape Install program to disk:

```
//I EBGNER      EXEC      PGM=I EBGNER
//SYSPRI NT     DD        SYSOUT=*
//SYSI N        DD        DUMMY
//SYSUT2        DD        DI SP=( , CATLG) , SPACE=( 3200, 10) ,
//          DSN=user-suppl i ed-name,          <--- Specify a data set name
//          UNI T=SYSALLDA, VOL=SER=xxxxxx <--- Specify a di sk vol ume
//SYSUT1        DD        DI SP=OLD, DSN=FDR. I NSTALL
//          LABEL=( 9, SL, EXPDT=98000) ,
//          UNI T=TAPE,    <--- Change i f requi red
//          VOL=SER=FDR52T<--- Change the VOLparameter to FDR52P i f
//                                the tape i s a production tape.
```

After the successful completion of the IEBGENER job, issue the following command to invoke the Tape Install program:

**LOAD 'user-supplied-name'**            Specify the same data set name as in  
the SYSUT2 DD statement of the IEBGENER job.

Note that the dsname that you specify in the LOAD command usually must be enclosed in apostrophes. If it is not, then the system not only will prefix your userid to the beginning of the name, but will also add a suffix of .OBJ at the end of the name.

The Tape Install program is loaded from the disk and begins execution.

Please proceed to [Section 92.03](#) 'The Tape Install Program'.

CONTINUED . . .

**92.03 THE TAPE INSTALL PROGRAM**

The Tape Install program initially prompts the user what, where and how to load the FDR tape files, in a series of four user friendly screens.

**No action takes place until the user specifically gives the final go-ahead (on the fourth screen).**

Only then, the selected data sets are allocated and cataloged with the specified names on the specified volumes and either the loading of the FDR tape files in the foreground begins, or a JCL stream is created to load the FDR tape files in the background.

Note: all data set and index name references are specified and displayed as fully qualified names; a TSO userid will not be prefixed to the names unless you key it in.

**1. Screen 1 – Data Set Selection Screen**

WELCOME TO INNOVATION'S FDR TOTAL DASD MANAGEMENT SYSTEM INSTALLATION    SCREEN 1	
PLEASE REPLY TO THE FOLLOWING PROMPTS. YOU WILL BE ABLE TO REVIEW AND CHANGE YOUR SPECIFICATIONS PRIOR TO THE ACTUAL LOADING OF THE TAPE.	
THE FOLLOWING DATA SETS MAY BE LOADED FROM THE INSTALLATION TAPE:	
1 – FDR INSTALLATION CONTROL LIBRARY	
2 – FDR DOCUMENTATION LIBRARY	
3 – FDR LOAD MODULE LIBRARY	
4 – FDR ISPF DIALOG CLIST LIBRARY	
5 – FDR ISPF DIALOG PANEL LIBRARY	
6 – FDR ISPF DIALOG MESSAGES LIBRARY	
7 – FDR ISPF DIALOG SKELETON LIBRARY	
-----	
<PRESS> "ENTER"	– SELECT ALL OF THE ABOVE DATA SETS AND CONTINUE
<TYPE> "N,N,.."	– SELECT THE SPECIFIED DATA SETS
<TYPE> "END"	– EXIT IMMEDIATELY
-----	
PLEASE SELECT ONE OF THE OPTIONS LISTED ABOVE	
SELECT ====> _	

Select all data sets that are to be loaded from the FDR tape. Normally, all data sets should be selected.

CONTINUED . . .

## 92.03 CONTINUED . . .

## 2. Screen 2 – Data Set Name Selection Screen

```

----- DATA SET NAME SELECTION SCREEN----- SCREEN 2
PLEASE REVIEW THE SELECTED DATA SET NAMES AND MAKE THE DESIRED MODIFICATIONS.

  1 – INSTALL CONTROL . . . . . IDP.ICLFDR52
  2 – DOCUMENTATION . . . . . IDP.DOCFDR52
  3 – LOAD LIBRARY . . . . . IDP.MODFDR52
  4 – ISPF CLISTS . . . . . IDP.DIALOG.CLIST
  5 – ISPF PANELS . . . . . IDP.DIALOG.PANELS
  6 – ISPF MESSAGES . . . . . IDP.DIALOG.MESSAGES
  7 – ISPF SKELETON . . . . . IDP.DIALOG.SKELETON

-----
<PRESS>  "ENTER"      -  USE THE ABOVE SPECIFICATIONS AND CONTINUE
<TYPE>   "ALL,INDEX"   -  ASSIGN NEW INDEX(ES) TO ALL DATA SET NAMES
<TYPE>   "N,NEWNAME"   -  ASSIGN A NEWNAME TO THE DATA SET DESIGNATED BY "N"
<TYPE>   "BACK"        -  GO BACK TO THE DATA SET SELECTION SCREEN 1
<TYPE>   "END"         -  EXIT IMMEDIATELY

-----
                                PLEASE SELECT ONE OF THE OPTIONS LISTED ABOVE

SELECT ==>  _

```

Specify the disk data set names for the FDR libraries that will be loaded from the tape. The installation program will create and catalog the specified data set names, or will update the already existing data sets.

**Notes:**

- a. The default data set names may be modified by specifying the new data set high level index(es) to be used in all selected data set names, or by assigning fully qualified data set names to specific data sets. (Note: the data set high level index(es) and data set names must always be fully qualified.)

Example 1. To cause all of the data set names to start with SYS2.TEST (that is, SYS2.TEST.ICLFDR52, SYS2.TEST.DOCFDR52, etc.), enter:  
ALL,SYS2.TEST

Example 2. To cause the load modules to be loaded into an existing data set named SYS2.TEST.LINKLIB, while all of the other data sets are loaded into new data sets with the default names shown on the screen, enter:  
3,SYS2.TEST.LINKLIB

- b. It is recommended that all data sets be newly created by the Tape Install program to avoid x37 abends. Most FDR functions require APF authorization, thus the FDR load module library must be APF authorized either explicitly or implicitly by virtue of being in the LINKLIST. Most ABR Operating System exits require the FDR load module library to be in the LINKLIST. An IPL is usually necessary to add the FDR load module library to the APF List or to the LINKLIST, (the next note item discusses how to). You may avoid this IPL by loading the FDR load module library into an already existing APF authorized or LINKLIST library.
- c. If the FDR load module library data set is created by the Tape Install program, the user must add this data set name and its associated volume serial to the APF authorization list (member IEAAPF00 in SYS1.PARMLIB), or to the LINKLIST (member LNKLIST00 in SYS1.PARMLIB). Eventually, the FDR load module library will have to be added to the LINKLIST in order for the ABR Operating System exits to execute. (Note: for MVS/XA and MVS/ESA, you may have to add to both APF list and LINKLIST in case your installation has specified LNKAUTH=APFTAB in member IEASYS00 in SYS1.PARMLIB. An IPL is required for the new APF authorization list or LINKLIST to become active.

Many installations have facilities to add libraries to the APF Authorization List or to the LINKLIST dynamically. If your installation has such a facility, it is appropriate to use it for the FDR load library and avoid an IPL.

CONTINUED . . .



## 92.03 CONTINUED . . .

## 3. Screen 3 – Volume Serial Selection Screen

```

----- VOLUME SERIAL SELECTION SCREEN ----- SCREEN 3
THE FOLLOWING NEW DATA SETS WILL BE ALLOCATED AND CATALOGED:

      DISP      VOLUME      DATA SET NAME
1 – NSTALL CONTROL . . . . . NEW      SCR083      IDP.ICLFDR52
2 – DOCUMENTATION . . . . . NEW      SCR083      IDP.DOCFDR52
3 – LOAD LIBRARY . . . . . NEW      SCR083      IDP.MODFDR52
4 – ISPF CLISTS . . . . . NEW      SCR083      IDP.DIALOG.CLIST
5 – ISPF PANELS . . . . . NEW      SCR083      IDP.DIALOG.PANELS
6 – ISPF MESSAGES . . . . . NEW      SCR083      IDP.DIALOG.MESSAGES
7 – ISPF SKELETON . . . . . NEW      SCR083      IDP.DIALOG.SKELETON
-----
<PRESS>  "ENTER"      -  USE THE ABOVE SPECIFICATIONS AND CONTINUE
<TYPE>   "ALL,VOLUME" -  ASSIGN A VOLUME FOR ALL NEWLY ALLOCATED DATA SETS
<TYPE>   "N,VOLUME"  -  ASSIGN A VOLUME TO THE DATA SET DESIGNATED BY "N"
<TYPE>   "SMS"        -  DISPLAY SMS SPECIFICATIONS
<TYPE>   "BACK"       -  GO BACK TO THE DATA SET NAME SELECTION SCREEN 2
<TYPE>   "END"        -  EXIT IMMEDIATELY
-----
                                PLEASE SELECT ONE OF THE OPTIONS LISTED ABOVE
SELECT ==> _

```

Specify the volume serial where all new data sets or a specific new data set are to be created and cataloged. Alternatively, on systems where SMS is active, the volume serial and SMS class information may optionally be specified for new data sets.

Note: an existing data set may not have its volume serial nor its SMS class information changed.

On systems where SMS is active, the SMS class specifications screen is displayed by typing "SMS" on the Volume Serial Selection Screen.

```

----- STORAGE CLASS SELECTION SCREEN ----- SCREEN 3
THE FOLLOWING NEW DATA SETS WILL BE ALLOCATED AND CATALOGED:

      DISP      STORCLAS     DATA SET NAME
1 – INSTALL CONTROL . . . . . NEW      OEMSOFT     IDP.ICLFDR52
2 – DOCUMENTATION . . . . . NEW      OEMSOFT     IDP.DOCFDR52
3 – LOAD LIBRARY . . . . . NEW      OEMSOFT     IDP.MODFDR52
4 – ISPF CLISTS . . . . . NEW      OEMSOFT     IDP.DIALOG.CLIST
5 – ISPF PANELS . . . . . NEW      OEMSOFT     IDP.DIALOG.PANELS
6 – ISPF MESSAGES . . . . . NEW      OEMSOFT     IDP.DIALOG.MESSAGES
7 – ISPF SKELETON . . . . . NEW      OEMSOFT     P.DIALOG.SKELETON
-----
<PRESS>  "ENTER"      -  USE THE ABOVE SPECIFICATIONS AND CONTINUE
<TYPE>   "ALL,STORCL" -  ASSIGN A STORCLAS TO ALL NEWLY ALLOCATED DATA SETS
<TYPE>   "N,STORCL"  -  ASSIGN A STORCLAS TO THE DATA SET DESIGNATED BY "N"
<TYPE>   "SMS"        -  DISPLAY SMS DATA CLASS SPECIFICATIONS
<TYPE>   "BACK"       -  GO BACK TO THE DATA SET NAME SELECTION SCREEN 2
<TYPE>   "END"        -  EXIT IMMEDIATELY
-----
                                PLEASE SELECT ONE OF THE OPTIONS LISTED ABOVE
SELECT ==> _

```

CONTINUED . . .

## 92.03 CONTINUED . . .

The SMS Data class specifications screen is displayed by typing "SMS" on the Storage Class Selection Screen.

```

-----DATA CLASS SELECTION SCREEN ----- SCREEN 3

THE FOLLOWING NEW DATA SETS WILL BE ALLOCATED AND CATALOGED:

      DISP      DATACLAS  DATA SET NAME
1 - INSTALL CONTROL . . . . . NEW      CNTL      IDP.ICLFDR52
2 - DOCUMENTATION . . . . . NEW      DOC        DP.DOCFDR52
3 - LOAD LIBRARY . . . . . NEW      LOAD        IDP.MODFDR52
4 - ISPF CLISTS . . . . . NEW      CLIST       IDP.DIALOG.CLIST
5 - ISPF PANELS . . . . . NEW      PANELS      IDP.DIALOG.PANELS
6 - SPF MESSAGES . . . . . NEW      MESSAGES    IDP.DIALOG.MESSAGES
7 - SPF SKELETON . . . . . NEW      SKELETON    IDP.DIALOG.SKELETON

-----
<PRESS>  "ENTER"      -  USE THE ABOVE SPECIFICATIONS AND CONTINUE
<TYPE>   "ALL,DATACL" -  ASSIGN A DATACLAS TO ALL NEWLY ALLOCATED DATA SETS
<TYPE>   "N,DATACL"  -  ASSIGN A DATACLAS TO THE DATA SET DESIGNATED BY "N"
<TYPE>   "SMS"        -  DISPLAY SMS MANAGEMENT CLASS SPECIFICATIONS
<TYPE>   "BACK"       -  GO BACK TO THE DATA SET NAME SELECTION SCREEN 2
<TYPE>   "END"        -  EXIT IMMEDIATELY

-----
                                PLEASE SELECT ONE OF THE OPTIONS LISTED ABOVE

SELECT ==> _

```

The SMS Management class specifications screen is displayed by typing "SMS" on the Data Class Selection Screen.

```

-----MANAGEMENT CLASS SELECTION SCREEN ----- SCREEN 3

THE FOLLOWING NEW DATA SETS WILL BE ALLOCATED AND CATALOGED:

      DISP      MGMTCLAS  DATA SET NAME
1 - INSTALL CONTROL . . . . . NEW      IDP.ICLFDR52
2 - DOCUMENTATION . . . . . NEW      IDP.DOCFDR52
3 - LOAD LIBRARY . . . . . NEW      IDP.MODFDR52
4 - ISPF CLISTS . . . . . NEW      IDP.DIALOG.CLIST
5 - ISPF PANELS . . . . . NEW      IDP.DIALOG.PANELS
6 - ISPF MESSAGES . . . . . NEW      IDP.DIALOG.MESSAGES
7 - ISPF SKELETON . . . . . NEW      IDP.DIALOG.SKELETON

-----
<PRESS>  "ENTER"      -  USE THE ABOVE SPECIFICATIONS AND CONTINUE
<TYPE>   "ALL,MGMTCL" -  ASSIGN A MGMTCLAS TO ALL NEWLY ALLOCATED DATA SETS
<TYPE>   "N,MGMTCL"  -  ASSIGN A MGMTCLAS TO THE DATA SET DESIGNATED BY "N"
<TYPE>   "SER"        -  DISPLAY VOLUME SERIAL SPECIFICATIONS
<TYPE>   "BACK"       -  GO BACK TO THE DATA SET NAME SELECTION SCREEN 2
<TYPE>   "END"        -  EXIT IMMEDIATELY

-----
                                PLEASE SELECT ONE OF THE OPTIONS LISTED ABOVE

SELECT ==> _

```

The Volume Serial specifications screen is re-displayed by typing "SER" on the Management Class Selection Screen.

CONTINUED . . .

## 92.03 CONTINUED . . .

## 4. Screen 4 – Installation Processing Option Screen

```

----- INSTALLATION PROCESSING OPTION SCREEN ----- SCREEN 4

PLEASE VERIFY THE FOLLOWING SPECIFICATIONS AND SELECT THE PROCESSING OPTION:

      DISP      VOLUME      DATA SET NAME
1 – INSTALL CONTROL . . . . . NEW      SCR083      IDP.ICLFDR52
2 – DOCUMENTATION . . . . . NEW      SCR083      IDP.DOCFDR52
3 – LOAD LIBRARY . . . . . NEW      SCR083      IDP.MODFDR52
4 – ISPF CLISTS . . . . . NEW      SCR083      IDP.DIALOG.CLIST
5 – ISPF PANELS . . . . . NEW      SCR083      IDP.DIALOG.PANELS
6 – ISPF MESSAGES . . . . . NEW      SCR083      IDP.DIALOG.MESSAGES
7 – ISPF SKELETON . . . . . NEW      SCR083      IDP.DIALOG.SKELETON

-----
<TYPE>  "FG"          – START LOADING THE ABOVE DATA SETS IMMEDIATELY
<TYPE>  "BG"          – CREATE THE JCL TO LOAD THE ABOVE DATA SETS
<TYPE>  "BACK"        – GO BACK TO THE DATA SET SELECTION SCREEN 1
<TYPE>  "END"         – EXIT IMMEDIATELY
-----

PLEASE SELECT ONE OF THE OPTIONS LISTED ABOVE

SELECT ==>> 1 _

```

Review all the information, and select whether to continue the FDR tape load process in the foreground or to create a JCL stream to complete the loading of the FDR tape files in the background.

The option of loading in the foreground is available only if the Tape Install program is being executed directly from tape ([Section 92.02](#) Step 2) and not if it is being executed from disk ([Section 92.02](#) Step 3).

1. If **foreground (FG)** is chosen, the requested new data sets (if any) are created and cataloged. IEBCOPY is invoked to load the selected files (the CLIST file is in IEBUPDTE format and is loaded by the Tape Install program).
2. If **background (BG)** is chosen, the requested new data sets (if any) are created and cataloged in the foreground, and a batch JCL stream is created in a member named **FDRLOAD** contained either in the **FDR Installation Control Library** data set or (if this data set was not selected to be loaded) in a data set named '**15&userid .FDRTEMP.JCL**'. Review this JCL stream and submit it to the background.

Notes:

- a. If IEBCOPY gives a non-zero return code, it is considered to be an error.
- b. If an ABEND System x37 occurs, [see Section 92.07](#).

**92.04 AFTER THE FDR TAPE IS LOADED**

The following sections apply only to sites that have ISPF (Interactive System Productivity Facility).

If you don't have ISPF, please continue the installation process using the install instructions contained in [Section 90.01](#). Bear in mind that the installation items dealing with the loading of the distribution tape have been completed by the Tape Install Program.

**Checklist for FDR Installation using ISPF ([Section 92.05](#))**

✓	STEP NUMBER	APPLIES		DESCRIPTION
		NEW USERS	EXISTING USERS	
	1	✓	✓	Customize ISPF menu if necessary
	2	✓	✓	Allocate ABR dialog libraries
	3	✓	✓	Select the ABR Install dialog
	4	✓	✓	Set the ABR Global Options
	5	✓	✓	Set the COMPAKTOR Unmovable Take
	6	✓	✓	Set ABR Protect and Restore Allocation Lists
	7	✓		Create the ABR Catalog
	8	✓		Set ABR disk processing options
	9	✓		Create the ABR Archive Control File
	10	✓	✓	Set ABR Dialog Options
	11	✓		Create the Remote Queue Datasets
	12	✓	✓	Test online and batch functions
	13	✓	✓	Install and test MVS exits
	14	✓		Full testing of the FDR System

**92.05 FDR INSTALLATION USING ISPF**

If the FDR ISPF data sets were loaded, then the Tape Install program created a CLIST member named ABRALLOC in the FDR CLIST Library. This CLIST provides for the concatenation of the FDR libraries in front of your current ISPF DDname allocations.

Use the ABRALLOC CLIST for installation and testing; for permanent use, either place the FDR Dialog libraries in the TSO Logon PROC, or use the LIBDEF service (available with ISPF V 2.2 or higher), both procedures are documented in [Section 92.07](#).

**STEP 1** The FDR Dialog Panel Library contains a sample ISPF primary options menu (ISR@PRIM) and its associated tutorial panel (ISR00003). If your current ISPF primary options menu has been modified, you may apply those modifications to the menu in the FDR panel library, or incorporate the ABR option in your current primary options menu ([See Section 92.07 for more information](#)).

**STEP 2** Get into TSO "READY" mode (exit ISPF), and issue the command:

**EXEC 'IDP.DIALOG.CLIST(ABRALLOC)' <---- Use the data set name of the FDR CLIST Library that was specified in the installation process.**

This command will reallocate the ISPF libraries and will invoke ISPF.

**STEP 3** Select the ABR option (option "A") on the ISPF primary options menu, as illustrated in the following figure:

**ISPF  
PRIMARY  
MENU**

-----ISPF/PDF PRIMARY OPTION MENU-----

OPTION ==> A \_

0	ISPF PARMS	- Specify terminal and user parameters	USERID	- DF
1	BROWSE	- Display source data or output listings	TIME	- 16:14
2	EDIT	- Create or change source data	TERMINAL	- 3278
3	UTILITIES	- Perform utility functions	PF KEYS	- 24
4	FOREGROUND	- Invoke foreground language processors	DATE	- 91/06/14
5	BATCH	- Submit job for language processing	JULIAN	- 91.165
6	COMMAND	- Enter TSO command or CLIST	APPLID	- ISR
7	DIALOG TEST	- Perform dialog testing		
8	LM UTILITIES	- Perform library administrator utility functions		
9	IBM PRODUCTS	- Additional IBM program development products		
10	SCLM	- Software Configuration and Library Manager		
A	FDR/ABR	- Perform selected DASD management functions		
C	CHANGES	- Display summary of changes for this release		
T	TUTORIAL	- Display information about ISPF/PDF		
X	EXIT	- Terminate ISPF using log and list defaults		

Enter END command to terminate ISPF.

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 3** Select option "I" (INSTALL) in the FDR Primary Options Menu, as illustrated on the following figure:  
**(continued)**

**PANEL A**  
**ABR MENU**

```

----- FDR TOTAL DASD MANAGEMENT SYSTEM - FDR PRIMARY OPTIONS MENU -----
OPTION ==> I_
  1  REPORTS      -  ABR REPORTING FUNCTIONS
  2  RESTORE      -  ABR DATA SET RESTORE
  3  ARCHIVE      -  ABR DATA SET ARCHIVE OR SUPERSCRATCH
  4  BACKUP       -  ABR DATA SET BACKUP
  5  REMOTE Q     -  ABR REMOTE QUEUE UTILITY FUNCTIONS
  C  COMPAKTOR    -  COMPAKTOR MAP AND SIMULATION REPORTS
  R  RELEASE      -  COMPAKTOR RELEASE
  D  DSF          -  DSF DATA SET DUMP AND RESTORE
  F  FDR          -  FDR FULL VOLUME DUMP AND RESTORE
  I  INSTALL      -  INSTALLATION AND MAINTENANCE OF FDR/ABR/CPK
  J  JCL PARMS    -  SPECIFY FDR JCL AND SYSOUT DEFAULTS FOR SUBMITTED JOBS
  K  FORMAT       -  MODIFY FORMAT OF GENERATED REPORTS
  M  MESSAGES     -  FDR MESSAGES AND CODES QUERY FACILITY
  Q  QUERY        -  FDR/ABR STATISTICS QUERY
  S  SRS          -  SEARCH, REPORT, SERVICES DIALOG

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```

The installation panels provide for interactive specification of the FDR Global Options and the dynamic creation of JCL streams necessary to complete the installation process.

**Restricting the use of the installation panels:**

The member ABRINPRI in the FDR Dialog CLIST library contains instructions for restricting access to the installation dialogs.

Furthermore, if the installation has a data security system, then all users who are permitted to use the FDR dialogs should be granted execute-only access to the FDR Dialog CLIST library.

**CHANGING  
 THE DATA SET  
 NAMES OF  
 THE FDR LI-  
 BRARIES**

The data set names of FDR libraries are stored in the ABRALLOC, ABRINPRI and ABRGLOBL CLISTs.

If the name of an FDR library is changed after it is loaded from the installation tape, specify the new library name in the corresponding keyword value in the following CLISTs:

1) ABRALLOC CLIST keywords:

```

CLIST..... FDR Dialog CLIST Library
LLIB..... FDR Load Module Library
PLIB..... FDR Dialog Panel Library
MLIB..... FDR Dialog Message Library
SLIB..... FDR Dialog Skeleton Library

```

2) ABRINPRI CLIST keywords:

```

ICLDSN..... FDR Installation Control Library
CLDSN..... FDR Dialog CLIST Library
LIB..... FDR Load Module Library

```

Note:the value for the TOD keyword should be incremented by 1 in order to refresh the FDR Library names primed in the ISPF profile.

3) ABRGLOBL CLIST keywords:

```

DOCDNS..... FDR Documentation Library
LIB..... FDR Load Module Library

```

Note:The names in the ABRGLOBL CLIST can be updated by using ISPF panel A.I.10

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 4** You have already completed option 1 (loading the FDR distribution tape). Please select option "4" (SETOPT) in the FDR Installation Options Menu, as illustrated in the following figure:

**PANEL A.I**  
**FDR/ABR/CPK**  
**INSTALLA-**  
**TION MENU**

```

----- FDR TOTAL DASD MANAGEMENT SYSTEM - INSTALLATION OPTIONS MENU-----
OPTION ==> 4 _
    1  INSTALL      -   LOAD SELECTED LIBRARIES FROM THE FDR DISTRIBUTION TAPE
    2  LOADSAR      -   LOAD THE STAND-ALONE PROGRAM (SAR) ONTO DISK
    4  SETOPT       -   SET INSTALLATION OPTIONS IN THE FDR GLOBAL OPTIONS TABLE
    COMPAKTOR OPTION INSTALLATION
    5  SETCPK       -   SET UP THE COMPAKTOR UNMOVABLE TABLE
    ABR OPTION INSTALLATION
    6  SETLIST      -   SET UP THE ABR PROTECT LISTS AND RESTORE ALLOCATION LIST
    7  ABRCAT       -   CREATE THE ABR CATALOG
    8  ABRVOL       -   SET ABR DISK VOLUME PROCESSING OPTIONS
    9  BLDARC       -   CREATE THE ARCHIVE CONTROL FILE
   10  DIALOG       -   SET FDR DIALOG GLOBAL OPTIONS
   13  EXITS        -   NSTALL THE ABR OPERATING SYSTEM EXITS
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```

The FDR Global Options Table (module FDROPT) contains installation options for security features, user exits, control statement defaults, etc., organized by option type, as illustrated in the following figure:

**PANEL A.I.4**  
**SET GLOBAL**  
**OPTIONS**

```

----- FDR INSTALLATION - SET FDR GLOBAL OPTIONS PRIMARY MENU-----
OPTION ==> _
    1 - SECURITY OPTIONS
    2 - GENERAL OPTIONS
    3 - COMPAKTOR OPTIONS
    4 - ABR GENERAL OPTIONS
    5 - ABR DATA SET NAMES
    6 - ABR ARCHIVE UTILITY DEFAULTS
    7 - ABR DISK PROCESSING OPTIONS
    8 - MORE ABR GENERAL OPTIONS
    9 - ABR REPORT DEFAULTS
   10 - MORE ABR REPORT DEFAULTS
   11 - OPERATING SYSTEM EXITS
    SAVE - SAVE OPTION CHANGES
    RESET - RE-INITIALIZE ALL OPTIONS
    CANCEL - EXIT WITHOUT SAVING CHANGES
    COPY - COPY OPTIONS FROM A PRIOR LEVEL
    AUDIT - DISPLAY USER CHANGED OPTIONS
    HELP - DISPLAY TUTORIAL PANELS

FDR PROGRAM LIBRARY DATA SET:
  DATA SET NAME ==> 'IDP.MODFDR52'

NOTE: TO REFRESH THE OPTIONS THAT ARE DYNAMICALLY INSTALLED IN THE ACTIVE LPA,
IT IS NECESSARY TO RUN FDRSTART. ON MVS/ESA, FIRST ISSUE 'MODIFY LLA,REFRESH'.

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```

Specify the correct data set name for the FDR program library.

**CHANGING**  
**OPTIONS**

If the FDR Global Options are changed, and the Dynamic Installation of the ABR exits is in use ([Section 92.50](#)); additionally to refreshing the LLA (MVS/ESA only) or similar linklist lookaside (such as Quickfetch), it is required to execute FDRSTART as a batch job to refresh the options that are dynamically installed in the Active Link Pack Area. For additional details see [Section 92.51](#), Step 8 – Changing Options.

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 4** **NEW INSTALLATIONS:**  
(continued)

Please review [Section 91](#) of the manual for detailed information regarding the FDR Global Options.

The FDR Global Options that are especially important and should be set at this time are:

- 1 – Security Options ([Section 91.03](#) and [91.06](#), panel A.I.4.1)
- 2 – ABR Data Set Names ([Section 91.04](#), panel A.I.4.5).
- 3 – Installations that have a Tape Management System should set the TMS option ([Section 91.04](#), panel A.I.4.4).

**EXISTING INSTALLATIONS:**

Use the COPY command in the FDR Global Options Panel (A.I.4) to copy the option values set at a prior level.

**Caution:** DO NOT USE IEBCOPY or ISPF COPY to copy the FDROPT module from a Prior level.

Warning: If you are currently using the DSCB field at offset 78 to record OLDBACKUP information, please call Innovation for conversion considerations.

\* \* \*

This dialog is functionally equivalent to the FDRZAPOP program, and may be used for setting the FDR Global Option values wherever the FDRZAPOP program is referred to in [Section 91](#).

If an option type (such as Security) is selected, a panel containing the options is displayed. If an option value is changed, the user will be prompted whether to save or cancel the changes before terminating the dialog.

**PANEL A.I.4.1****SECURITY  
OPTIONS**

```

----- FDR INSTALLATION – SET FDR GLOBAL SECURITY OPTIONS-----
COMMAND ==> _

ALLCALL      RACF ALWAYS CALL OPTION ENABLED. .... NO
RACF          ISSUE RACHECK FOR PROTECTED DATA SETS AND FULL VOLUME .... NO

OPENALL      OPEN ALL SELECTED DATA SETS. .... NO
VSAMPASS     OPEN PASSWORD PROTECTED DATA SETS (VSAM). .... NO

PASSWORD     OPEN PASSWORD PROTECTED DATA SETS (NON-VSAM) .... NO
FDRPASS      SIMPLIFIED VOLUME PROTECTION ENABLED .... NO

NOABSTRK     ABSOLUTE TRACK OPERATIONS ALLOWED .... YES
NONEW        RENAME USING NEWDD, NEWNAME, NEWINDEX AND NEWGROUP ALLOWED .... YES

OPENEXIT     VOLUME SECURITY EXIT ACTIVE .....NO ..... EXIT NAME ..... FDRXOPEN
SECEXIT      DATASET SECURITY EXIT ACTIVE .....NO ..... EXIT NAME ..... FDRXPASS

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```

The Option keyword is displayed on the left, followed by a short description and the current option value.

CONTINUED . . .



## 92.05 CONTINUED . . .

**STEP 4** Complete option descriptions are available in tutorial help panels (displayed by pressing the PF1  
**(continued)** HELP key), as illustrated in the following figures:

## PANEL A.I.4.1

## TUTORIAL

TUTORIAL----- FDR INSTALLATION – SET FDR GLOBAL SECURITY OPTIONS----- TUTORIAL  
 COMMAND ==> \_

## | SECURITY OPTIONS |

PLEASE CONSULT [SECTION 91](#) OF THE USER MANUAL FOR DETAILED INFORMATION.

SECURITY THE PROGRAMS IN THE FDR SYSTEM BYPASS MOST VOLUME OR DATA SET  
 OPTIONS SECURITY BUILT INTO THE OPERATING SYSTEM. FDR DOES NOT GO THROUGH  
 A NORMAL OPEN PROCEDURE WHEN DUMPING, ARCHIVING OR RESTORING DATA  
 SETS. THE FDR SYSTEM SUPPORTS SEVERAL DIFFERENT TYPES OF SECURITY.  
 PASSWORD, RACF, RACF COMPATIBLE SYSTEMS, ACF2, ETC. PROTECTION CAN  
 BE ENABLED OR CHANGED USING PROGRAM FDRZAPOP. [SECTION 91.06](#) DETAILS THE  
 SECURITY OPTIONS SUPPORTED BY THE FDR SYSTEM.

ENABLING/ THE FDR SYSTEM SUPPORTS SEVERAL DIFFERENT TYPES OF SECURITY,  
 DISABLING INCLUDING PASSWORD AND RACF PROTECTION, USER EXITS, AND OTHER  
 DATA SET SPECIAL OPTIONS. THE PROGRAMS IN THE FDR SYSTEM NORMALLY WILL NOT  
 SECURITY NVOKE ANY TYPE OF SECURITY WHEN DUMPING OR RESTORING DATA SETS OR  
 VOLUMES. YOU MUST ENABLE THE OPTIONS APPROPRIATE FOR YOUR INSTALLATION.  
 (CONTINUED)

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## PANEL A.I.4.1

## TUTORIAL

TUTORIAL----- FDR INSTALLATION – SET FDR GLOBAL SECURITY OPTIONS----- TUTORIAL  
 COMMAND ==> \_

PLEASE CONSULT [SECTION 91.06](#) OF THE USER MANUAL FOR DETAILED INFORMATION.

ALLCALL – ACTIVATE THE RACF ALWAYS CALL OPTION. THE ALWAYS CALL OPTION REQUIRES THE  
 RACHECK MACRO BE USED FOR BOTH FULL VOLUME AND DATA SET LEVEL PROTECTION  
 CHECKS. SINCE ALL DATA SETS ARE CONSIDERED PROTECTED, THE RACF BIT NEED NOT  
 BE ON IN THE DSCB.

RACF – REQUIRES THE RACHECK MACRO BE USED FOR BOTH FULL VOLUME AND DATA SET LEVEL  
 PROTECTION CHECKS. RACHECK WILL ONLY BE ISSUED AT THE DATA SET LEVEL IF THE  
 RACF BIT IS ON IN THE DSCB.

OPENALL – ALL SELECTED DATA SETS WILL BE OPENED TO ESTABLISH PROCESSING AUTHORITY  
 PRIOR TO PERFORMING THE REQUIRED FUNCTION. THIS OPTION WILL CAUSE FDR TO  
 OPEN ALL DATA SETS IN THE VTOC DURING THE DUMP BUT WILL BE IGNORED DURING FDR  
 RESTORES. FDRDSF WILL OPEN EACH DATA SET SELECTED.  
 NOTE: WILL CAUSE THE LAST REFERENCED DATE TO BE UPDATED.

(CONTINUED)

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CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 4** An Option/Panel number cross-reference panel is available by requesting option "4" from the  
**(continued)** tutorial panel for the Set FDR Global Options panel (select option A.I.4, press the PF1 HELP key and select option 4).

**OPTION/PANEL****XREF PANEL**

TUTORIAL ----- FDR INSTALLATION -- OPTION/TYPE XREF INDEX (A-L) ----- TUTORIAL COMMAND ==>			
ABRCC.....4	ARCSUM.....9	ERASE.....6	LXBYPSEC.....11.2
ABRDSNF.....11.1	BKPCOPY.....4	FDRCC.....2	LXCHKSEC.....11.2
ABRINDEX.....5	BKUPDMPQ.....5	FDRPASS.....1	LXCONUSE.....11.3
ABRLOC.....11.1	BKUPRSTQ.....5	FORCE.....7	LXCONVOL.....11.3
ABRPRE.....11.1	BLKF.....6	FREEAREA.....3	LXDFREST.....11.2
ACTMESS.....3	BUFNO.....2	GBLDSN.....10	LXEXIT.....11.2
ADAYS.....9	CONFINST.....11.1	GBLVOL.....10	LXFGERR.....11.2
ALLCALL.....1	CPKABSUN.....3	GEN.....7	LXFOREST.....11.2
ALLOCATEFLAG..4	CPKCC.....3	HILIGHT.....3	LXMAXREC.....11.3
APPSFX.....2	CPKOVRIID.....3	ICFCORE.....2	LXMAXSTC.....11.3
ARCDD.....6	CSLREF.....7	ICFSOURCE.....10	LXNCDENY.....11.3
ARCDSN.....5	CYCLE.....7	ICFSU60.....4	LXNEWVOL.....11.2
ARCHDMPQ.....5	DESCRIPTCODE..2	IEBCOPY.....11.1	LXNOMSG.....11.2
ARCHI.....8	DETAIL.....9	LASTABR.....9	LXRECDDEL.....11.3
ARCHRSTQ.....5	DISKUPDATE....4	LASTAPE.....5	LXREISSU.....11.2
ARCLOW.....8	DOCDSN.....5	LBPZERO.....2	LXSPFMIG.....11.3
ARCOPY.....4	DSNCK.....5	LINECNT.....2	LXSYNPROC.....11.2
ARCRECALL.....4	DYNAL.....10	LIST.....7	LXUNCAT.....11.3
ARCRESV.....6	DYNARC.....6	LXALTMMSG.....11.3	
(CONTINUED)			
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**OPTION/PANEL****XREF PANEL**

TUTORIAL ----- FDR INSTALLATION -- OPTION/TYPE XREF INDEX (A-L) ----- TUTORIAL COMMAND ==>			
MAXICF.....10	NOSECOND.....3	RACF.....1	SORTCORE.....9
MAXONLINE.....10	OFFLN.....4	RECALL.....6	SORTMSG.....9
MAXTCVX.....10	OLDBACKUP.....9	RECS.....6	SORTPFX.....9
MAXTREORG.....6	OLDBENT.....7	REORG.....6	SUM.....9
MAXTSVX.....10	OLDBOFF.....7	RETPD.....7	TMS.....4
MDLRESV.....7	OPENALL.....1	ROUTECD.....2	UNCAT.....6
MIGRAT.....4	OPENEXIT.....1	SCRATCH.....3	VSAMPASS.....1
MIGDEVT.....8	PASSWORD.....1	SCRINDEX.....5	WTDSN.....4
MOUNT.....4	POOLDASD.....2	SDAYS.....9	WTUNT.....4
MSG.....6	POOLDISK.....5	SECEXIT.....1	WTVOL.....4
NOABSTRK.....1	PXERRLEN.....11.5	SELTERR.....2	XDAYS.....9
NONEW.....1	PXNOGDG.....11.5	SIZEKEEP.....3	XREFERROR.....10
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CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 4**  
**(continued)****PANEL A.I.4.2****GENERAL**  
**OPTIONS**

----- FDR INSTALLATION – SET FDR GLOBAL GENERAL OPTIONS -----

COMMAND ==&gt; \_

APPSFX	END-OF-EXTENT APPENDAGE MODULE NAME SUFFIX (IGG019__)	YZ
BUFNO	PERFORMANCE OPTION (MAX), OR NUMBER OF BUFFERS FOR BACKUPS	MAX
ICFCORE	ICF VSAM CLUSTER AND COMPONENT NAMES TABLE SIZE (BYTES)	50000
FDRCC	FDR AND FDRDSF ERROR RETURN CODE	ABEND
LBPZERO	DATA SET LAST BLOCK POINTER VALUE OF ZERO IS VALID	NO
LINECNT	MAXIMUM NUMBER OF LINES TO BE PRINTED ON REPORTS	58
SELTERR	TREAT DATA SET SELECTION FAILURE AS AN ERROR	YES
POOLDASD	INTERFACE WITH POOLDASD FOR NON-VSAM DATA SET PLACEMENT	NO
ROUTECD	WTO ROUTING CODES	( 2,11)
DESCRIPTCD	WTO DESCRIPTOR CODES	( 2)

(CONTNUED)

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**PANEL A.I.4.3****COMPAKTOR**  
**OPTIONS**

----- FDR INSTALLATION – SET FDR GLOBAL COMPAKTOR OPTIONS-----

COMAND ==&gt; \_

ACTMESS	ISSUE MESSAGE FDRW81 'DETECTS VOLUME/UNIT IN USE'	YES
CPKCC	COMPAKTOR ERROR RETURN CODE	ABEND
CPKABSUN	TREAT ALL ABSOLUTE TRACK DATA SETS AS UNMOVABLE.	NO
CPKOVRI	ALLOW THE COMPAKTOR UNMOVABLE TABLE TO BE OVERRIDDEN	NO
HILIGHT	USE OVERPRINTING IN MAP REPORTS FOR FIELD CONTRAST	YES
SCRATCH	SCRATCH REQUESTS ALLOWED	YES
NOSECOND	ALLOW RELEASE IF NO SECONDARY ALLOCATION IS DEFINED	YES
SIZEKEEP	CONTIGUOUS EXTENT SIZE TO TRY TO KEEP IN PLACE (TRKS)	100
FREEAREA	TARGET PERCENT REDUCTION IN THE NUMBER OF FREE SPACE AREAS	90
MAXKEEP	MAX NUMBER OF DATA SET EXTENTS TO BE ELIGIBLE FOR SIZEKEEP	5

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CONTINUED . . .

## 92.05 CONTINUED . . .

STEP 4  
(continued)

## PANEL A.I.4.4

ABR GENERAL  
OPTIONS

```

-----FDR INSTALLATION – SET FDR GLOBAL OPTIONS FOR ABR-----
COMMAND ==> _

ABRCC      ABR ERROR RETURN CODE ..... 12
DISKUPDATE SET DSCB FLAGS FOR REMOTE QUEUE BACKUP AND ARCHIVE DUMPS ..... YES
ICFSU60    UPDATE FLAG AND LAST REFERENCE DATE SET ON ICF VSAM FILES ..... NO
TMS        TAPE MANAGEMENT SYSTEM PRODUCT IS INSTALLED ON THIS SYSTEM ..... NO

ARCARECALL ARCHIVE DATA SETS FOR AUTO-RECALL ..... NO
MIGRAT     USE VOLSER 'MIGRAT' ON ARCHIVE RECATALOG FOR AUTO-RECALL ..... NO
ARCOPY     DEFAULT ARCHIVE BACKUP COPY NUMBER FOR ARCHIVE RESTORES ..... 1
BKPCOPY    DEFAULT BACKUP COPY NUMBER FOR BACKUP RESTORES ..... 1

ALLOCATEFLAG – DYNAMIC ALLOCATION FLAGS
WTVOL      WAIT FOR VOLUMES. .... NO
WTDSN      WAIT FOR DATA SETS (IF JES3 THEN SPECIFY 'NO') ..... NO
WTUNT      WAIT FOR UNITS ..... NO
OFFLN      CONSIDER OFFLINE VOLUMES. .... NO
MOUNT      VOLUME MOUNT PERMITTED ..... NO

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```

## PANEL A.I.4.5

ABR DATA SET  
NAMES

```

----- FDR INSTALLATION – SET FDR GLOBAL DATA SET NAME OPTIONS -----
COMMAND ==> _

ABRINDEX   HIGH LEVEL INDEX FOR BACKUPS AND ABR MODEL DSCBS..... FDRABR.
SCRINDEX   HIGH LEVEL INDEX FOR DATA SETS RECATALOGED BY SCRATCH EXIT.. #.
DSNCK      ARCHIVE AND REMOTE QUEUE DATA SET NAMES ARE STANDARD ..... YES

LASTAPE    LAST TAPE OPTION DATA SET NAME PREFIX ..... FDRABR.LASTAPE
POOLDISK   POOLDISK OPTION DATA SET NAME PREFIX ..... FDRABR.POOLDISK

DOCDSN     DOCUMENTATION DATA SET ..... IDP.DOCFDR52
ARCDSN     ARCHIVE CONTROL FILE ..... FDRABR.ARCHIVE

          REMOTE QUEUE DATA SETS
ARCHDMPQ   ARCHIVE DUMP QUEUE ..... FDRABR.ABRARDQ.DATA
ARCHRSTQ   ARCHIVE RESTORE QUEUE ..... FDRABR.ABRARCH.DATA
BKUPDMPQ   BACKUP DUMP QUEUE ..... FDRABR.ABRBKDQ.DATA
BKUPRSTQ   BACKUP RESTORE QUEUE ..... FDRABR.ABRREST.DATA

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```

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 4**  
**(continued)****PANEL A.I.4.6****ARCHIVE**  
**UTILITY DE-**  
**FAULTS**

```

----- FDR INSTALLATION -- SET ABR ARCHIVE UTILITY DEFAULTS-----
COMMAND ==> _

          FDRARCH UTILITY DEFAULTS
BLKF      DEFAULT NUMBER OF BLOCKS PER TRACK IN THE ARCHIVE FILE          2
RECS      DEFAULT NUMBER OF DATA SET ENTRIES IN THE ARCHIVE FILE        2000

          REORG%      PERCENTAGE OF FREE SPACE IN ARCHIVE FILE TO ISSUE WARNING  10
          ARCD D      DDNAME USED BY FDRARCH TO REFERENCE ARCHIVE FILE        ARCHIVE

          DYNARC      DYNAMIC ALLOCATION OF ARCHIVE FILE BY FDRARCH ALLOWED      NO
          ERASE        ARCHIVE FILE MAY BE RE-FORMATTED (WRITTEN OVER)          NO
          ARCRSV       PROTECT ARCHIVE FILE WITH RESERVE DURING UPDATE FUNCTION  YES

          FDRARCH ARCHIVE FILE REORGANIZATION OPTIONS
MAXTREORG  MAXIMUM NUMBER OF TAPE FILES MANAGED                          1000
RECALL     UNCATALOG AUTO-RECALL DATA SETS THAT WERE DROPPED              YES
UNCAT      UNCATALOG ARCHIVE TAPE FILES THAT ARE NO LONGER NEEDED            YES
MSG         PRINT UNCATALOGED TAPE FILES THAT ARE NO LONGER NEEDED            YES

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```

**PANEL A.I.4.7****ABR VOLUME**  
**OPTIONS**

```

----- FDR INSTALLATION -- SET ABR DISK VOLUME PROCESSING OPTIONS -----
COMMAND ==> _

          OLD BACKUP TABLE OPTIONS
OLDBENT    MAXIMUM NUMBER OF DATA SET OLD BACKUPS TABLED IN DSCB          13
OLDBOFF    DSCB RESERVED FIELD OFFSET TO USE FOR OLD BACKUP TABLE          62

          FDRABRM UTILITY DEFAULTS
CYCLE      MAXIMUM NUMBER OF AUTO-CYCLES CREATED PER GENERATION              10
GEN        NUMBER OF FULL VOLUME BACKUPS TO MAINTAIN CATALOGED                4
RETPD      RETENTION PERIOD IN DAYS OF ABR FULL VOLUME BACKUP TAPES          60

          FORCE        INITIALIZE DSCBS EVEN IF RESERVED BYTES ARE NOT ZERO      NO
          MDLRESV     PROTECT THE VTOC WITH RESERVE DURING VTOC MAINTENANCE      YES
          CSLREF      IF LAST REFERENCE DATE IS ZERO, RESET IT TO CURRENT DATE    NO

          LIST        PRODUCE VTOC REPORT OF DSCBS CHANGED BY VTOC MAINTENANCE    NO

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```

**Warning:** Innovation strongly recommends the use of the oldbackup offset 62 (option OLDBOFF), and the oldbackup number of entries 13 (option OLDBENT). Existing users that currently use other values need to perform a simple conversion of all disk volumes containing an ABR model; the conversion instructions are documented in [Section 55.04](#).

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 4  
(continued)**

-----FDR INSTALLATION -- SET FDR GLOBAL OPTIONS FOR ABR-----

COMMAND ==&gt; \_

**PANEL A.I.4.8****MORE ABR  
DEFAULTS**

ARCHI	DEFAULT ARCHIVE HIGH THRESHOLD (PERCENTAGE OF USED SPACE) . . . . .	80
ARCLOW	DEFAULT ARCHIVE LOW THRESHOLD (PERCENTAGE OF USED SPACE) . . . . .	50
MIGDEVT	SET MIGRAT DEVICE TYPE TO THE ARCHIVE OUTPUT DEVICE TYPE. . . . .	NO

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**PANEL A.I.4.9****ABR REPORT  
DEFAULTS**

----- FDR INSTALLATION -- SET FDR GLOBAL REPORT OPTIONS -----

COMMAND ==&gt; \_

ARCHIVE REPORT		
ADAYS	NUMBER OF DAYS SINCE A DATA SET HAS BEEN REFERENCED . . . . .	30
SDAYS	NUMBER OF DAYS BACK TO CALCULATE STOP DATE . . . . .	0
XDAYS	NUMBER OF DAYS AHEAD TO CALCULATE FUTURE EXPIRATION DATE . . . . .	10
ARCSUM	PRINT ARCHIVE FILE SUMMARY . . . . .	YES
VTOC REPORT		
DETAIL	PRINT DATA SET INFORMATION IN VTOC LIST FUNCTIONS . . . . .	YES
SUM	PRINT SUMMARY IN VTOC LIST FUNCTIONS . . . . .	YES
SORT OPTIONS		
SORTCORE	STORAGE REQUIRED FOR EXTERNAL SORT (BYTES) . . . . .	100000
SORTMSG	MESSAGE OPTION FOR EXTERNAL SORT PROGRAM . . . . .	CC
SORTPFX	DNAME PREFIX FOR EXTERNAL SORT PROGRAM . . . . .	SORT
LASTABR	DAYS AFTER ABR LAST PROCESSED THE VOLUME TO ISSUE WARNING . . . . .	7
OLDBACKUP	OLD BACKUP TO REPORT ----- ( CURRENT )	

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**PANEL A.I.4.10****ABR REPORT  
DEFAULTS**

----- FDR INSTALLATION -- SET FDR GLOBAL REPORT OPTIONS -----

COMMAND ==&gt; \_

ICFSOURCE	SOURCE OF ICF VSAM DATA AND INDEX COMPONENT INFORMATION . . . . .	DEFAULT ( DEFAULT VVDS LOCATE )
MAXICF	MAXIMUM NUMBER OF ICF CLUSTERS PROCESSED AT ONE TIME . . . . .	400
GBLDSN	GENERIC NAME FOR SELECTION OF ALL DATA SETS . . . . .	&ALLDSN
GBLVOL	GENERIC NAME FOR SELECTION OF ALL VOLUMES . . . . .	&ALLV
DYNAL	DYNAMIC ALLOCATION OF DISK DEVICES ALLOWED . . . . .	YES
MAXONLINE	MAXIMUM NUMBER OF VOLUMES PROCESSED PER PROGRAM EXECUTION . . . . .	256
MAXTCVX	MAXIMUM NUMBER OF BACKUP TAPES TABLED FOR ALL DISK VOLUMES . . . . .	1000
MAXTSVX	MAXIMUM NUMBER OF BACKUP TAPES TABLED PER DISK VOLUME . . . . .	100
XREFERERROR	LOW SEVERITY WARNING MESSAGES ARE PRINTED IN BACKUP REPORT . . . . .	YES

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CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 4**  
**(continued)****PANEL A.I.4.11****MORE**  
**ABR EXIT**  
**OPTIONS**  
**MENU**

----- FDR INSTALLATION -- SET OPERATING SYSTEM EXIT OPTIONS-----

OPTION ==&gt; \_

- |   |   |                                       |
|---|---|---------------------------------------|
| 1 | - | ABR DYNAMIC INSTALLATION OPTIONS      |
| 2 | - | ABR CATALOG LOCATE EXIT OPTIONS       |
| 3 | - | MORE ABR CATALOG LOCATE EXIT OPTIONS  |
| 4 | - | ABR DATA SET NOT FOUND EXIT OPTIONS   |
| 5 | - | ABR DADSM PRE-PROCESSING EXIT OPTIONS |

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**PANEL**  
**A.I.4.11.1****DYNAMIC IN-**  
**STALLATION**  
**OPTIONS**

----- FDR INSTALLATION -- SET ABR DYNAMIC INSTALLATION OPTIONS-----

COMMAND ==&gt; \_

ABRLOC	DYNAMICALLY INSTALL THE CATALOG LOCATE EXIT . . . . .	NO
ABRDSNF	DYNAMICALLY INSTALL THE DATASET NOT FOUND EXIT. . . . .	NO
ABRPRE	DYNAMICALLY INSTALL THE DADSM PRE-EXIT . . . . .	NO
IEBCOPY	DYNAMICALLY INSTALL FDRREORG TO PROCESS IEBCOPY COMPRESS . . . . .	NO
CONFINST	CONFIRM INSTALLATION OF THE ABR SYSTEM EXITS AT IPL TIME . . . . .	NO

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CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 4**  
**(continued)****PANEL**  
**A.I.4.11.2**  
**LOCATE EXIT**  
**OPTIONS**

```

----- FDR INSTALLATION -- SET FDR GLOBAL AUTO-RECALL OPTIONS -----
COMMAND ==> _

LXFOREST  USER IS ASKED TO CONFIRM RESTORE ..... YES
LXDFREST  RESTORE TYPE(S) FOR TSO AUTO-RECALL ..... FG,BG,RQ
          ( NO NONE FG FOREGROUND BG BACKGROUND RQ REMOTE QUEUE )

LXFGERR   RETRY AUTO-RECALL REQUEST IF FG FAILS ( NO, BG OR RQ ) ..... NO
LXNOMSG   SUPPRESS AUTO-RECALL MESSAGES IF TSO RECALL IS DISABLED. .... NO
LXNEWVOL  USER MAY SPECIFY A NEW VOLUME SERIAL WHERE TO RESTORE ..... YES
LXREISSU  PROMPT TO CONFIRM THE SPECIFIED NEW VOLUME SERIAL ..... NO

LXSYNPROC CATALOGED PROCEDURE NAME USED FOR BACKGROUND RESTORES ..... SYNRECAL

          AUTO-RECALL SECURITY OPTIONS
LXCHKSEC  CHECK SECURITY BEFORE THE AUTO-RECALL RESTORE OPERATION ..... NO
LXBYPSEC  BYPASS SECURITY DURING AUTO-RECALL RESTORE OPERATION. .... NO

LXEXIT    RECALL SECURITY EXIT ACTIVE..... NO .....EXIT NAME ..... NONE

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```

**PANEL**  
**A.I.4.11.3**  
**MORE**  
**LOCATE EXIT**  
**OPTIONS**

```

-----FDR INSTALLATION -- MORE ABR GLOBAL AUTO-RECALL OPTIONS -----
COMMAND ==> _

SAVE      - SAVE ALL OPTION CHANGES          CANCEL  - EXIT WITHOUT SAVING CHANGES
RESET     - RE-INITIALIZE ALL OPTIONS          HELP    - DISPLAY TUTORIAL PANELS

LXNCDENY  FAIL LOCATE WITH 'NOT CATALOGED' IF TSO USER DENIES RECALL..... YES

LXCONUSE  USE CONSTANT NEW VOLUME FOR ALL DATA SET RECALLS. .... NO
LXCONVOL  CONSTANT NEW VOLUME FOR ALL DATA SET RECALLS ..... NEWVOL

LXALTMSG  ISSUE ALTERNATE FDRW71 (CONFIRM RESTORE) MESSAGE FORMAT ..... NO

LXRECDEL  RECALL DATASETS REFERENCED BY IDCAMS OR TSO DELETE COMMAND ..... YES

LXUNCAT   ASK USER WHETHER TO UNCATALOG INSTEAD OF RECALLING DATASET ..... NO

LXSPFMIG  DISPLAY VOLSER MIGRAT FOR ARCHIVED DATASETS UNDER ISPF 3.4 ..... NO

LXMAXSTC  MAXIMUM NUMBER OF RECALL STARTED TASKS ACTIVE AT ONE TIME ..... NONE

LXMAXREC  LIMIT OF TOTAL RECALLS (INCLUDING STC) ACTIVE AT ONE TIME ..... NONE

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```

CONTINUED . . .



92.05 CONTINUED . . .

**STEP 4**  
**(continued)****PANEL**  
**A.I.4.11.5****DADSM**  
**PRE-EXIT**  
**OPTIONS**

-----FDR INSTALLATION -- SET ABR DADSM PRE-EXIT OPTIONS-----

COMMAND ==&gt; \_

PXNOGDG      NUMBER OF GDG GENERATIONS TO KEEP IN THE SCRATCH CATALOG.....4

PXERRLEN      ISSUE WTO MESSAGE IF SCRATCHED DSNAME EXCEEDS 42 CHARACTERS.....YES

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CONTINUED . . .

**92.05 CONTINUED . . .**

**STEP 5** If you have Compaktor, select option 5 in the FDR Installation Options Menu.

```

          - FDR TOTAL DASD MANAGEMENT SYSTEM -- INSTALLATION OPTIONS MENU- -----
OPTION ==> 5 _

      1  INSTALL      -   LOAD SELECTED LIBRARIES FROM THE FDR DISTRIBUTION TAPE
      2  LOADSAR      -   LOAD THE STAND-ALONE PROGRAM (SAR) ONTO DISK
      4  SETOPT       -   SET INSTALLATION OPTIONS IN THE FDR GLOBAL OPTIONS TABLE

COMPAKTOR OPTION INSTALLATION

      5  SETCPK       -   SET UP THE COMPAKTOR UNMOVABLE TABLE

ABR OPTION INSTALLATION

      6  SETLIST      -   SET UP THE ABR PROTECT LISTS AND RESTORE ALLOCATION LIST
      7  ABRCAT       -   CREATE THE ABR CATALOG
      8  ABRVOL       -   SET ABR DISK VOLUME PROCESSING OPTIONS
      9  BLDARC       -   CREATE THE ARCHIVE CONTROL FILE
     10  DIALOG       -   SET FDR DIALOG GLOBAL OPTIONS

     13  EXITS        -   INSTALL THE ABR OPERATING SYSTEM EXITS

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```

This dialog is functionally equivalent to the FDRZAPOP program.

**PANEL A.I.5**  
**COMPAKTOR**  
**UNMOVABLE**  
**TABLE**

```

----- FDR INSTALLATION -- COMPAKTOR UNMOVABLE TABLE -----
COMMAND ==> _                                SCROLL ==> PAGE
PLEASE DEPRESS THE 'ENTER' KEY TO DISPLAY THE TABLE
FDR PROGRAM LIBRARY DATA SET:
      DATA SET NAME ==> 'IDP.MODFDR52'
TABLE OVERRIDE ALLOWED ==> NO
      (AT EXECUTION TIME)

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```

Specify the correct data set name for the FDR program library.

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 5**  
**(continued)**

```

----- FDR INSTALLATION -- COMPAKTOR UNMOVABLE TABLE ----- ROW 1 OF 3
COMMAND ==> _                                SCROLL ==> PAGE

      SAVE  -  SAVE CHANGES      COPY  -  COPY THE MODULE  CANCEL -  EXIT IMMEDIATELY
      RESET -- RESET MODULE      FIND  -- FIND A STRING    HELP  -- TUTORIAL PANELS

      DSN/
      CMD          DSG  DATA SET NAME OR GROUP

                        DSG  SYS1.VTOCIX
                        DSG  SYS1.VVDS
                        DSN  SYS1.LOGREC

***** BOTTOM OF DATA *****

```

The Compaktor Unmovable Table specifies data sets that COMPAKTOR will leave in the same location when it reorganizes disk volumes. This table should include your LINKLIST data sets, Tape Management Catalog (if you have one), and the other data sets listed in [Section 40.24](#) that are not ENQ'ed by the system.

Basic line commands ( I – insert; D – delete; R – repeat ) are used to add and delete entries in the table.

You may exclude (protect) certain volumes from COMPAKTOR processing by making special entries in the COMPAKTOR Unmovable Table. If COMPAKTOR finds a name in the Unmovable Table in the format:

```
FDRCPK. EXCLUDE. COMPAKT. Vvvvvvv
```

any attempt to do any COMPAKTion on volume "vvvvvv" will result in a warning. If the name is:

```
FDRCPK. EXCLUDE. RELEASE. Vvvvvvv
```

then space release (TYPE=RLSE) will be inhibited. If the name in the table is a DSN entry, then only the named volume is excluded. If the entry is a DSG, then "vvvvvv" must be 5 or fewer characters and all volumes starting with that prefix will be excluded.

For example, entries of

```
DSN FDRCPK. EXCLUDE. COMPAKT. VTS0123
DSG FDRCPK. EXCLUDE. RELEASE. VTS0
```

will exclude volume TS0123 from COMPAKTion functions, and will exclude all TSO volumes from release processing.

You can use this volume exclusion to protect certain volumes or groups of volumes that should not normally be COMPAKTed against accidental COMPAKTion or Release.

**NEW INSTALLATIONS:**

Please review [Sections 91.04](#) and [40.24](#) to figure out which data sets should be included in this table.

**EXISTING INSTALLATIONS:**

To copy from a prior level, display the new Compaktor Unmovable Table and issue the COPY command. You may also use IEBCOPY or ISPF COPY to copy module FDRCPKUM into the new FDR load library.

The source code for module FDRCPKUM is supplied in the Installation Control Library. You may change the source code to allow for more entries and then assemble and linkedit the module.

CONTINUED . . .

**92.05 CONTINUED . . .**

**STEP 6** If you are installing ABR, please proceed to step 6a. If you are not installing ABR, then you are now ready to test the FDR/CPK and FDRREORG system.

**NEW INSTALLATIONS:**

Sections 10 through 40 of the manual detail the JCL, control statements and options for running FDR (full volume component), FDRDSF (data set component), SAR (stand alone component) and CPK (volume reorganization and release component). Section 21.20, 25 and 26 of the manual documents FDRREORG.

**EXISTING INSTALLATIONS:**

A STEPLIB DD statement should be used to point to the FDR library containing the new version. Once the testing has been completed, reinstall or copy the FDR programs into the production library or replace the previous FDR library name with the new one in your system's LINKLIST. The FDR Global Options table (module FDROPT) and COMPAKTOR UNMOVABLE table (module FDRCPKUM) can be copied from the test library if you re-install.

**STEP 6A NEW INSTALLATIONS:**

Optionally, set up the ABR Protect Lists and the ABR RESTORE Allocation Control Lists (Section 91). These lists can be used to exclude specified data sets from various types of ABR processing, and control volume selection for ABR RESTORES.

**EXISTING INSTALLATIONS:**

If you are currently using the ABR PROTECT lists or Restore Allocation Control List (Section 91.05), you may either (A) use ISPF COPY to copy modules FDRPROTA, FDRPROTD, FDRPROTR, FDRPROTS and FDRALLOC to the new FDR program library from the program library for the previous release, or (B) display each list using the install panels and issue the COPY command.

The source code for the PROTECT lists and Restore Allocation Control List is now supplied in the Installation Control Library. You may change the source code to allow more entries and then assemble and linkedit the module.

\* \* \*

Select option "6" (SETLIST) in the FDR Installation Options Menu, as shown in the following figure:

```

-----FDR TOTAL DASD MANAGEMENT SYSTEM -- INSTALLATION OPTIONS MENU-----
OPTION ==>  6 _

    1  INSTALL      -   LOAD SELECTED LIBRARIES FROM THE FDR DISTRIBUTION TAPE
    2  LOADSAR      -   LOAD THE STAND-ALONE PROGRAM (SAR) ONTO DISK

    4  SETOPT       -   SET INSTALLATION OPTIONS IN THE FDR GLOBAL OPTIONS TABLE

COMPAKTOR OPTION INSTALLATION

    5  SETCPK       -   SET UP THE COMPAKTOR UNMOVABLE TABLE

ABR OPTION INSTALLATION

    6  SETLIST      -   SET UP THE ABR PROTECT LISTS AND RESTORE ALLOCATION LIST
    7  ABRCAT       -   CREATE THE ABR CATALOG
    8  ABRVOL       -   SET ABR DISK VOLUME PROCESSING OPTIONS
    9  BLDARC       -   CREATE THE ARCHIVE CONTROL FILE
   10  DIALOG       -   SET FDR DIALOG GLOBAL OPTIONS

   13  EXITS        -   INSTALL THE ABR OPERATING SYSTEM EXITS

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```

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 6A (continued)** Each list may be activated or deactivated (by placing a "YES" or a " NO" on the ACTIVE field). A list is selected to be displayed by entering its corresponding number in the OPTION field.

**PANEL A.I.6**  
**ABR PROTECT**  
**LISTS AND**  
**RESTORE**  
**ALLOCATION**  
**LIST**

```

----- FDR INSTALLATION -- ABR PROTECT LISTS AND RESTORE ALLOCATION LIST -----
OPTION ==> _                                SCROLL ==> PAGE

  1  ALLOCATE      -  ABR RESTORE ALLOCATION LIST . . . . . ACTIVE ==> NO
  2  ARCPROT       -  ABR ARCHIVE PROTECT LIST  . . . . . ACTIVE ==> NO
  3  ABRPROT       -  ABR BACKUP PROTECT LIST   . . . . . ACTIVE ==> NO
  4  RESTPROT      -  ABR RESTORE PROTECT LIST  . . . . . ACTIVE ==> NO
  5  SCRPROT       -  ABR SCRATCH PROTECT LIST  . . . . . ACTIVE ==> NO

FDR PROGRAM LIBRARY DATA SET:
DATA SET NAME ==> 'IDP.MODFDR52'

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```

Specify the correct data set name for the FDR program library.

The ABR Restore Allocation List gives the user the capability to specify to ABR where specific archived data sets will be restored to if the original volume is not online or is full.

**PANEL A.I.6.1**  
**ABR RESTORE**  
**ALLOCATION**  
**LIST**

```

----- FDR INSTALLATION -- RESTORE ALLOCATION LIST ----- ROW 1 OF 4
COMMAND ==> _                                SCROLL ==> PAGE

SAVE   -  SAVE CHANGES      COPY -  COPY THE MODULE      CANCEL -  EXIT IMMEDIATELY
RESET  -  RESET MODULE        FIND  -  FIND A STRING        HELP   -  TUTORIAL PANELS

CMD  ALLOCATE STATEMENT  (NOTE: VALIDATION IS DELAYED UNTIL MODULE IS SAVED)
-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7---
      ALLOCATE ALLDSN,VOL=SCR083,NVOL=MVSRS1
      ALLOCATE DSG=SYS1.,VOL=PAGE01,NVOL=MVSRS1
      ALLOCATE DSG=SYS2.,VOL=PAGE01,NVOL=MVSRS1
      ALLOCATE DSG=SYS3.,VOL=PAGE01,NVOL=MVSRS1
***** BOTTOM OF DATA *****

```

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 6A**  
**(continued)**

The ABR Archive Protect List specifies the data set names or groups that are to be excluded during an ABR archive dump operation. These data set(s) will never be eligible for archive.

**PANEL A.I.6.2****ABR ARCHIVE**  
**PROTECT LIST**

```

----- FDR INSTALLATION -- ARCHIVE PROTECTION LIST -----ROW 1 OF 2
COMMAND ==> _                                           SCROLL ==> PAGE

SAVE  -  SAVE CHANGES      COPY -  COPY THE MODULE      CANCEL °  EXIT IMMEDIATELY
RESET -  RESET MODULE       FIND -  FIND A STRING        HELP  -  TUTORIAL PANELS

      DSN/
CMD   DSG  DATA SET NAME OR GROUP                      VOL/    VOLUME
      _____                      _____
      DSG  SYS3.                      VOLG    SERIAL
      _____                      _____
      ALLDSNVOL                      MVSRS1
      _____                      _____

***** BOTTOM OF DATA *****

```

The ABR Backup Protect List specifies the data set names or groups that are to be excluded during an ABR incremental dump operation.

**PANEL A.I.6.3****ABR BACKUP**  
**PROTECT LIST**

```

----- FDR INSTALLATION -- BACKUP PROTECTION LIST -----ROW 1 OF 2
COMMAND ==>                                           15 _SCROLL ==> PAGE

SAVE  -  SAVE CHANGES      COPY -  COPY THE MODULE      CANCEL -  EXIT IMMEDIATELY
RESET -  RESET MODULE       FIND -  FIND A STRING        HELP  -  TUTORIAL PANELS

      DSN/
CMD   DSG  DATA SET NAME OR GROUP                      VOL/    VOLUME
      _____                      _____
      DSG  SYS3.                      VOLG    SERIAL
      _____                      _____
      ALLDSN                      VOL    MVSRS1
      _____                      _____
      .....

***** BOTTOM OF DATA *****

```

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 6A (continued)** The ABR Restore Protect List specifies the data set names or groups that are to be excluded during an ABR data set or archive restore operation. These data set(s) can never be restored, except in a full volume restore.

**PANEL A.I.6.4****ABR RESTORE  
PROTECT LIST**

```

----- FDR INSTALLATION -- RESTORE PROTECTION LIST -----ROW 1 OF 2
COMMAND ==> _                                           SCROLL ==> PAGE

SAVE  -  SAVE CHANGES      COPY -  COPY THE MODULE      CANCEL -  EXIT IMMEDIATELY
RESET -  RESET MODULE       FIND  -  FIND A STRING      HELP  -  TUTORIAL PANELS

      DSN/
CMD   DSG  DATA SET NAME OR GROUP                      VOL/   VOLUME
      _____                      _____
      DSG  SYS3.                      _____  ALLVOL
      _____                      _____
      ALLDSN                      VOLG   MVS
      _____                      _____
      .....
***** BOTTOM OF DATA *****

```

The ABR Scratch Protect List specifies the data set names or groups that are to be excluded during an ABR superscratch (type=scr) operation. These data set(s) will never be eligible for superscratch operations.

**PANEL A.I.6.5****ABR SCRATCH  
PROTECT LIST**

```

----- FDR INSTALLATION -- SCRATCH PROTECTION LIST -----ROW 1 OF 2
COMMAND ==> _                                           SCROLL ==> PAGE

SAVE  -  SAVE CHANGES      COPY -  COPY THE MODULE      CANCEL -  EXIT IMMEDIATELY
RESET -  RESET MODULE       FIND  -  FIND A STRING      HELP  -  TUTORIAL PANELS

      DSN/
CMD   DSG  DATA SET NAME OR GROUP                      VOL/   VOLUME
      _____                      _____
      DSG  SYS3.                      _____  ALLVOL
      _____                      _____
      ALLDSN                      VOL   MVSRS1
      _____                      _____
      .....
***** BOTTOM OF DATA *****

```

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 7 NEW INSTALLATIONS:**

Create the ABR catalog (Sections 90.16 through 90.19). The ABR catalog will contain entries for backup files created by ABR and for scratched data sets recorded by the DADSM PRE-PROCESSING EXIT.

Select option "7" (ABRCAT) in the FDR Installation Options Menu, as illustrated in the following figure:

```

----- FDR TOTAL DASD MANAGEMENT SYSTEM -- INSTALLATION OPTIONS MENU -----
OPTION ==> 7 _

  1  INSTALL      -   LOAD SELECTED LIBRARIES FROM THE FDR DISTRIBUTION TAPE
  2  LOADSAR      -   LOAD THE STAND-ALONE PROGRAM (SAR) ONTO DISK

  4  SETOPT       -   SET INSTALLATION OPTIONS IN THE FDR GLOBAL OPTIONS TABLE

COMPAKTOR OPTION INSTALLATION

  5  SETCPK       -   SET UP THE COMPAKTOR UNMOVABLE TABLE

ABR OPTION INSTALLATION

  6  SETLIST      -   SET UP THE ABR PROTECT LISTS AND RESTORE ALLOCATION LIST
  7  ABRCAT       -   CREATE THE ABR CATALOG
  8  ABRVOL       -   SET ABR DISK VOLUME PROCESSING OPTIONS
  9  BLDARC       -   CREATE THE ARCHIVE CONTROL FILE
 10  DIALOG       -   SET FDR DIALOG GLOBAL OPTIONS

 13  EXITS        -   INSTALL THE ABR OPERATING SYSTEM EXITS

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```

**PANEL A.I.7****CREATE ABR  
CATALOG**

```

----- FDR INSTALLATION -- CREATE THE ABR CATALOG -----
COMMAND ==> _

EDIT -- EDIT CREATE JCL  SUBMIT -- SUBMIT JOB  CANCEL -- EXIT IMMEDIATELY

ABR CATALOG NAME  ==> CATALOG.ABRBASE
MASTER CATALOG   ==>                                     (OPTIONAL)

CATALOG TYPE      ==> ICF           ALLOCATION UNIT  ==> CYL
SHARED CATALOG    ==> NO            PRIMARY QUANTITY ==> 5
CATALOG VOLUME    ==> MVSRS1        SECONDARY QUAN  ==> 2
DEVICE TYPE       ==> 3380          FREESPACE CI%   ==> 10 CA% ==> 20

HIGH LEVEL INDEX FOR ABR BACKUPS  ==> FDRABR      (BLANK IF NOT DESIRED)
HIGH LEVEL INDEX FOR SCRATCH ENTRIES ==> #         (BLANK IF NOT DESIRED)

SYSOUT CLASS      ==> *
JOB STATEMENT INFORMATION:
==> //DFA JOB (ACCOUNT),'NAME',
==> //              NOTIFY=DF
==> //*
==> //*

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```

CONTINUED . . .



## 92.05 CONTINUED . . .

**STEP 8 NEW INSTALLATIONS:**

Set the ABR disk volume processing options ([Sections 90.20 through 90.26](#)) for any disk volume on which you want to use ABR for backups or ARCHIVEing (this is also referred to as "initializing the ABR volumes"). This process will create a MODEL DSCB on the specified volumes, which will control the ABR processing for the volume. In addition, ABR will use two reserved bytes in the DSCB for each data set on the volume. Setting ABR disk volume processing options does not affect any data set currently on the volume. This dialog may also be used to display and change the ABR volume processing options.

Select option "8" (ABRVOL) in the FDR Installation Options Menu.

```

----- FDR TOTAL DASD MANAGEMENT SYSTEM -- INSTALLATION OPTIONS MENU -----
OPTION ==> 8 _

    1  INSTALL      -   LOAD SELECTED LIBRARIES FROM THE FDR DISTRIBUTION TAPE
    2  LOADSAR      -   LOAD THE STAND-ALONE PROGRAM (SAR) ONTO DISK

    4  SETOPT       -   SET INSTALLATION OPTIONS IN THE FDR GLOBAL OPTIONS TABLE

COMPAKTOR OPTION INSTALLATION

    5  SETCPK       -   SET UP THE COMPAKTOR UNMOVABLE TABLE

ABR OPTION INSTALLATION

    6  SETLIST      -   SET UP THE ABR PROTECT LISTS AND RESTORE ALLOCATION LIST
    7  ABRCAT       -   CREATE THE ABR CATALOG
    8  ABRVOL      -   SET ABR DISK VOLUME PROCESSING OPTIONS
    9  BLDARC       -   CREATE THE ARCHIVE CONTROL FILE
   10  DIALOG       -   SET FDR DIALOG GLOBAL OPTIONS

   13  EXITS        -   INSTALL THE ABR OPERATING SYSTEM EXITS

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```

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 8**  
**(continued)****PANEL A.I.8****SET ABR**  
**VOLUME**  
**OPTIONS**

```

----- FDR INSTALLATION -- SET ABR DISK VOLUME PROCESSING OPTIONS -----
COMMAND ==> _                                SCROLL ==> PAGE

PLEASE DEPRESS THE 'ENTER' KEY TO DISPLAY THE TABLE
THE ABR DISK VOLUME PROCESSING OPTIONS MUST BE SET PRIOR TO ABR EXECUTION.
SETTING THE ABR PROCESSING OPTIONS DOES NOT AFFECT NORMAL USE OF THE VOLUME.
FDR PROGRAM LIBRARY DATA SET:
  DATA SET NAME ==> 'IDP.MODFDR52'
  SYSOUT CLASS ==> *

JOB STATEMENT INFORMATION:
  ==> //DFA JOB (ACCOUNT),'NAME',
  ==> //      NOTIFY=DF
  ==> //*
  ==> //*

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```

Specify the correct data set name for the FDR program library.

```

----- FDR INSTALLATION -- SET ABR VOLUME PROCESSING OPTIONS -----ROW 1 OF 3
COMMAND ==> _
SUBMIT -- SUBMIT FDRABRM BATCH JOB  EDIT  -- EDIT FDRABRM BATCH JOB
FIND   -- FIND THE SPECIFIED STRING  HELP  -- DISPLAY TUTORIAL PANELS
MAX GEN  ARCHIVE  STORCLAS  FORCE

```

CMD	VOLUME SERIAL	GEN	CYC	EXPDT	AC	MOD	MAX AC RETPD	SCRATCH OLDBKUP	ARCHI ARCLOW
----	-----	----	-----	-----	----	-----	-----	-----	-----
	SCR082	****	NO	MODEL	**	NO	4 10 60	YES NO NO	NO 80 50
----	-----	----	-----	-----	----	-----	-----	-----	-----
	SCR083	****	NO	MODEL	**	NO	4 10 60	YES YES NO	NO 80 50
----	-----	----	-----	-----	----	-----	-----	-----	-----
	IDPLB1	178	2	90320	2	NO	5 10 35	NO NO YES	NO
----	-----	----	-----	-----	----	-----	-----	-----	-----

```

*****
***** BOTTOM OF DATA *****

```

The above list was created by specifying SCR \* in the volume serial field, where "\*" is a mask character. The current backup fields contain the string "NO MODEL" for those disk volumes which have not been set up for ABR processing. Other current backup field strings are documented in the tutorial help.

Basic line commands ( I – insert; D – delete; R – repeat ) are also used to add and delete entries in the table.

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 9 NEW INSTALLATIONS:**

If you intend to do ARCHIVing, create the ARCHIVE Control file ([Sections 90.27 through 90.30](#)). The ARCHIVE Control file will contain entries for data sets ARCHIVed by ABR.

Select option "9" (BLDARC) in the FDR Installation Options Menu.

```

----- FDR TOTAL DASD MANAGEMENT SYSTEM -- INSTALLATION OPTIONS MENU -----
OPTION ==> 9 _

      1  INSTALL      -   LOAD SELECTED LIBRARIES FROM THE FDR DISTRIBUTION TAPE
      2  LOADSAR      -   LOAD THE STAND-ALONE PROGRAM (SAR) ONTO DISK

      4  SETOPT       -   SET INSTALLATION OPTIONS IN THE FDR GLOBAL OPTIONS TABLE

COMPAKTOR OPTION INSTALLATION

      5  SETCPK       -   SET UP THE COMPAKTOR UNMOVABLE TABLE

ABR OPTION INSTALLATION

      6  SETLIST      -   SET UP THE ABR PROTECT LISTS AND RESTORE ALLOCATION LIST
      7  ABRCAT       -   CREATE THE ABR CATALOG
      8  ABRVOL       -   SET ABR DISK VOLUME PROCESSING OPTIONS
      9  BLDARC       -   CREATE THE ARCHIVE CONTROL FILE
     10  DIALOG       -   SET FDR DIALOG GLOBAL OPTIONS

     13  EXITS        -   INSTALL THE ABR OPERATING SYSTEM EXITS

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```

**PANEL A.I.9****CREATE  
ARCHIVE FILE**

```

----- FDR INSTALLATION -- ABR ARCHIVE FILE INITIALIZATION -----
COMMAND ==> _

      SUBMIT -- SUBMIT INITIALIZATION JOB      CANCEL -- EXIT IMMEDIATELY
      ARCHIVE DATA SET NAME      ==>FDRABR.ARCHIVE
      STANDARD DATA SET NAME     ==>YES
      MAX DATA SET ENTRIES       ==>10000
      BLOCKS PER TRACK            ==>2
      VOLUME SERIAL NUMBER        ==>MVSRS1
      FDR PROGRAM LIBRARY NAME     ==>'IDP.MODFDR52'
      SYSPRINT SYSOUT CLASS       ==>*
      JOB STATEMENT INFORMATION:
      ==> //DFZ JOB (ACCOUNT),'NAME',
      ==> //      NOTIFY=DF
      ==> //*
      ==> /*
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```

Specify the correct data set name for the FDR program library.

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 10** Customize the ABR Global CLIST for the FDR ISPF Dialog Support ([Section 56](#)). The Dialog Support provides ISPF panels that give end-users easy access to most of the user-oriented functions of ABR.

Select option "10" (DIALOG) in the FDR Installation Options Menu.

```

----- FDR TOTAL DASD MANAGEMENT SYSTEM -- INSTALLATION OPTIONS MENU -----
OPTION ==> 10 _

      1  INSTALL      -   LOAD SELECTED LIBRARIES FROM THE FDR DISTRIBUTION TAPE
      2  LOADSAR      -   LOAD THE STAND-ALONE PROGRAM (SAR) ONTO DISK

      4  SETOPT       -   SET INSTALLATION OPTIONS IN THE FDR GLOBAL OPTIONS TABLE

COMPAKTOR OPTION INSTALLATION

      5  SETCPK       -   SET UP THE COMPAKTOR UNMOVABLE TABLE

ABR OPTION INSTALLATION

      6  SETLIST      -   SET UP THE ABR PROTECT LISTS AND RESTORE ALLOCATION LIST
      7  ABRCAT       -   CREATE THE ABR CATALOG
      8  ABRVOL       -   SET ABR DISK VOLUME PROCESSING OPTIONS
      9  BLDARC       -   CREATE THE ARCHIVE CONTROL FILE
     10  DIALOG       -   SET FDR DIALOG GLOBAL OPTIONS

     13  EXITS        -   INSTALL THE ABR OPERATING SYSTEM EXITS

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```

**PANEL A.I.10****ABR DIALOG  
GLOBAL  
OPTIONS**

```

----- FDR INSTALLATION -- SET FDR DIALOG GLOBAL OPTIONS -----
COMMAND ==> _

THE FDR DIALOG CLIST LIBRARY CONTAINS A MEMBER ABRGLOBL WHICH MUST BE TAILORED
TO REFLECT THE USER'S ENVIRONMENT.

THE ABRGLOBL CLIST CONSISTS OF GLOBAL VARIABLES THAT ARE REQUIRED FOR EXECUTION
OF THE ABR ISPF/PDF COMMANDS.

THE DESCRIPTION OF ALL ABRGLOBL VARIABLES IS AVAILABLE IN THE TUTORIAL PANELS.

THE FOLLOWING PANEL CONTAINS THE ABRGLOBL VARIABLE KEYWORDS AND THEIR ASSOCIATED
VALUES, PLEASE USE THE TUTORIAL PANELS OR SECTION 92.08 IN THE USER'S MANUAL FOR
THE VARIABLE KEYWORDS DESCRIPTION.

FDR DIALOG CLIST LIBRARY:
  DATA SET NAME ==> 'IDP.DIALOG.CLIST'

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```

Specify the correct data set name for the FDR Dialog CLIST library.

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 10**  
**(continued)**

```

----- FDR INSTALLATION -- SET FDR DIALOG GLOBAL OPTIONS-----
COMMAND ==> _

      SAVE – SAVE CHANGES   COPY – COPY OPTIONS   CANCEL – EXIT IMMEDIATELY

BACKGRND .....YES
FOREGRND .....NO
REMOTEQ. ....YES
SCRATCH .....NO

DISKUPDT.....DEFAULT      SORT.....YES      BUNIT .....TAPE
UNIT.....          SORTMSG.....SYSOUT    BVOLPFX ..FDRTF
XECUT.....CALL      SORTVOL .....NONSPEC  RPTEXCL ..$$

FSUFIX .....SPFCLIST
FVOL ..... WRKPK1,WRKPK2

LIB .....DP.MODFDR52
FDRLIB .....TLT.FDRLIB.DATA
DOCDSN.....IDP.DOCFDR52
SORTLIB .....SYS1.SORTLIB
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```

The ABRGLOBL variables are documented in the help tutorials and in [Section 92.08](#).

**NEW INSTALLATIONS:**

Except for the FDR Installation Dialogs, all FDR dialogs utilize the variable values specified in the ABRGLOBL CLIST. The ABRGLOBL CLIST variables will probably require some changes in order for the FDR dialogs to execute successfully. The variables that are essential for the dialogs are: BUNIT, DISKUPDT, LIB, SORTLIB and XECUT.

If you intend to do functions other than reports and remote queue operations in the foreground, such as data set backups, archives, restores or Compactor simulations (functions which require APF authorization), the TSO Authorized Program Name Table must be updated as documented in [Section 92.10](#); failure to do so will cause abnormal terminations with system Abend codes such as S338 and S913-20. The ABRGLOBL variable FVOL is also required to contain a list of volume serial(s) used for backup operations.

**EXISTING INSTALLATIONS:**

Use the COPY command in the FDR Dialog Global Options Panel to copy the ABRGLOBL CLIST options values set at a prior level.

Caution: DO NOT USE IEBCOPY or ISPF COPY to copy the ABRGLOBL CLIST from a prior level.

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 11 NEW INSTALLATIONS:**

If you intend to use the Remote Queue Utility (Section 54.01), allocate and catalog the Remote Queue data sets. The data set names are contained and may be set in the FDR Global Options Table (option A.I.4.5). The Remote Queue data sets should be allocated with one track primary space and one track secondary space and the following characteristics: RECFM=FB, LRECL=80, BLKSIZE=80, and DSORG=PS.

After the remote queue data sets are allocated, issue the following TSO command for each of the remote data sets in order to create an end-of-file record:

```
REPRO  IDS('NULLFILE')  ODS('remote-queue-dsname')  <---specify each remote queue data
                                                         set name
```

**STEP 12 NEW INSTALLATIONS:**

You can begin testing many of the batch and TSO functions within the FDR system, even before you activate the ABR Operating System exits. For example, the running of incremental backups and ARCHIVES does not require the exits to be installed, nor do most of the functions that are requested from the ISPF Panels. If FDR was not installed in the LINKLIST, a STEPLIB DD statement should be used to point to the FDR library.

**EXISTING INSTALLATIONS:**

You can begin testing many of the batch and TSO functions within the FDR system, even before you activate the ABR Operating System exits from the new release. For example, the running of incremental backups and ARCHIVES does not require the exits to be installed, nor do most of the functions that are requested from the ISPF panels. A STEPLIB DD statement should be used to point to the FDR library containing the new version.

If you are currently running with the SMP-installed ABR Operating System exits from an earlier release, then after the STEPLIB phase of testing has been completed, reinstall or copy the FDR programs into the production library or replace the previous FDR library name with the new one in your system's LINKLIST. The FDR Global Options table (module FDROPT), COMPAKTOR UNMOVABLE table (module FDRCPKUM) and the ABR PROTECT Lists and ABR RESTORE Allocation Control List can be copied from the test library if you re-install. The ABR Operating System exits from the old release will continue to operate correctly when the new version of ABR is installed in LINKLIST. However, do not enable any of the options for dynamically installing the exits from the new release, until you remove the old exits using SMP.

When the testing of the ABR dialogs has been completed, reinstall or copy the FDR dialog libraries (CLIST, panels, messages and skeleton) into the production dialog libraries or replace the previous FDR dialog library name with the new one in the Logon Procedure or if LIBDEF services are used, in the ISR@PRIM panel.

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 13 NEW INSTALLATIONS:**

Set up the dynamic installation of the ABR MVS Operating System exits ([Sections 92.50 through 92.52](#)). Although these exits are not required for ABR to function, they provide very important additional functions. Also, if your Operating System is at a lower level than MVS/DFP Version 3, use SMP to install the modification to record the update indicator and last reference date for ICF VSAM.

**A. CATALOG LOCATE EXIT and DATA SET NOT FOUND EXIT** ([Sections 52.20](#))

These exits implement the 'AUTOMATIC RECALL' function of ABR. With these exits installed, a reference, from either a batch job or a TSO user, to a data set that has been ARCHIVED, will cause the data set to be automatically restored. If these exits are not installed, any restore of an ARCHIVED data set must be explicitly requested.

**B. DADSM PRE-PROCESSING EXIT** ([Section 92.60](#)). The purpose of this exit is to record ABR backup information in the ABR SCRATCH Catalog for any data sets that are SCRATCHed or RENAMED by programs other than FDRABR and that have ABR backups. With the DADSM Pre-processing exit installed, a user can request the restore of a data set that has been SCRATCHed or RENAMED simply by specifying the data set name. If this exit is not installed, the user must tell ABR the generation and cycle on which the data set was backed up.

Also, when a data set is RENAMED, the DADSM Pre-processing exit clears the ABR backup indicators, to indicate that the data set has not been backed up under the new name. Also, when a new data set is allocated, or when a data set is extended to a new volume, this exit initializes the last reference date.

**C. Modification to record the Update Indicator and the Last Reference Date for ICF VSAM** ([Section 90.12A](#)) (only for MVS/370 DFP and MVS/XA DFP, Version 1 or 2; included in the Operating System in MVS/DFP Version 3 or higher). This modification activates an optional function of the Operating System. With this or an equivalent modification installed, ABR can do incremental backups of ICF VSAM, and can ARCHIVE ICF VSAM based on Last Reference Date. Otherwise, these functions are not available. This modification is not available for dynamic installation, but must be installed with SMP, in order to guarantee the continued time stamping of ICF VSAM data sets in IPLs where dynamic installation does not take place.

**D. FDRREORG IEBCOPY INTERCEPT** ([Section 92.65](#))

FDRREORG optimizes the IEBCOPY PDS compress-in-place operation providing substantial savings in elapsed time and resource consumption.

**EXISTING INSTALLATIONS:**

Set up the dynamic installation of the FDR/ABR MVS Operating System exits ([Sections 92.50 through 92.52](#)). The exits that are available for dynamic installation are the CATALOG LOCATE EXIT, the DATA SET NOT FOUND EXIT, and the DADSM PRE-PROCESSING EXIT and the FDRREORG IEBCOPY INTERCEPT.

Installations where the ABR Operating System exits from an earlier release are currently installed with SMP, must remove the old ABR exits before attempting dynamic installation. You may use the SMP panels (option A.I.13) to remove these exits.

Installations where the ABR Operating System exits from an earlier release (V 5.0E or higher) are currently installed dynamically, should test the new version of the exits using the procedure in [Section 92.52](#). After this testing has been completed, reinstall or copy the FDR programs into the production library or replace the previous FDR Library name with the new one in your system's LINKLIST. The FDR Global Options table (module FDROPT), COMPAKTOR UNMOVABLE table (module FDRCPKUM) and the ABR PROTECT Lists and ABR RESTORE Allocation Control List can be copied from the test library if you re-install. Placing the program library for the new release into LINKLIST, with the dynamic installation options set in FDROPT and with IEFSSNxx set up, will automatically cause the Operating System exits from the new release to be dynamically installed at the next IPL.

CONTINUED . . .

## 92.05 CONTINUED . . .

**STEP 13**  
**(continued)**

The modification to record the Update Indicator and the Last Reference Date for ICF VSAM (Section 90.12A) (only for MVS/370 DFP and MVS/XA DFP, Version 1 or 2) has not been changed. If this modification was previously installed in your system, it is not necessary to re-install it. If you install MVS/DFP Version 3 or higher, then the ICF VSAM modification will no longer be needed and should not be installed; in DFP V3, the Operating System will record the update indicator and last reference date as a default. The ICF VSAM modification is not available for dynamic installation, but must be installed with SMP, in order to guarantee the continued time stamping of ICF VSAM data sets in IPLs where dynamic installation does not take place.

You have now completed the production installation of the new version.

\* \* \*

Please turn to Section 92.50 for instructions on the dynamic installation procedure of the ABR Operating System exits.

Following are the panels available for SMP installation. Select option "13" (EXITS) in the FDR Installation Options Menu.

```

-----FDR TOTAL DASD MANAGEMENT SYSTEM -- INSTALLATION OPTIONS MENU -----
OPTION ==>  113 _
    1  INSTALL      -   LOAD SELECTED LIBRARIES FROM THE FDR DISTRIBUTION TAPE
    2  LOADSAR      -   LOAD THE STAND-ALONE PROGRAM (SAR) ONTO DISK

    4  SETOPT       -   SET INSTALLATION OPTIONS IN THE FDR GLOBAL OPTIONS TABLE

COMPAKTOR OPTION INSTALLATION

    5  SETCPK       -   SET UP THE COMPAKTOR UNMOVABLE TABLE

ABR OPTION INSTALLATION

    6  SETLIST      -   SET UP THE ABR PROTECT LISTS AND RESTORE ALLOCATION LIST
    7  ABRCAT       -   CREATE THE ABR CATALOG
    8  ABRVOL       -   SET ABR DISK VOLUME PROCESSING OPTIONS
    9  BLDARC       -   CREATE THE ARCHIVE CONTROL FILE
   10  DIALOG      -   SET FDR DIALOG GLOBAL OPTIONS

   13  EXITS        -   INSTALL THE ABR OPERATING SYSTEM EXITS

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```

Select the ABR exit to install by entering its corresponding number in the option field.

```

-----FDR INSTALLATION -- INSTALL THE ABR OPERATING SYSTEM EXITS-----
OPTION ==>  _
    1 -- ABR SCRATCH EXIT
    2 -- ABR DATA SET NOT FOUND EXIT
    3 -- ICF VSAM MOD TO SET THE UPDATE INDICATOR AND LAST REFERENCE DATE
    4 -- ABR CATALOG LOCATE EXIT
SMP TO USE          ==>  SMPE      ( SMPE / SMP4 )
SMP JCL PROC        ==>  SMPE
FMID                ==>  HDP2230
TARGET ZONE         ==>  TARGET   ( SMPE ONLY )
INSTALLATION CONTROL LIBRARY DATA SET:
  DATA SET NAME    ==>  'IDP.ICLFDR52'

JOB STATEMENT INFORMATION:
==>  //DFZ JOB (ACCOUNT),'NAME',
==>  //      NOTIFY=DF
==>  //*
==>  /*

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```

CONTINUED . . .



## 92.05 CONTINUED . . .

**STEP 13** The panel illustrated in the following figure is used to generate the SMP JCL stream to install the  
**(continued)** ICF Vsam Usermod.

```
-----FDR INSTALLATION -- INSTALL THE ICF VSAM USERMOD-----  
OPTION ==> _  
EDIT  -- DISPLAY OR CHANGE SMP JOB   CANCEL -- EXIT IMMEDIATELY  
SUBMIT -- SUBMIT GENERATED SMP JOB   HELP  -- DISPLAY TUTORIAL PANELS  
      RS  -- RESTORE (REMOVE A PRIOR LEVEL OF THE ICF VSAM MOD, IF ANY)  
      RJ  -- REJECT (REJECT A PRIOR LEVEL OF THE ICF VSAM MOD, IF ANY)  
      1   -- RECEIVE THE ICF VSAM USERMOD  
      2   -- APPLY THE ICF VSAM USERMOD  
          -- NOTIFY ABR THAT THE UPDATE INDICATOR AND LAST REFERENCE DATE ARE BEING  
          MAINTAINED FOR ICF VSAM DATA SETS: ENABLE THE ICFSU60 OPTION IN THE  
          FDR GLOBAL OPTIONS TABLE (OPTION 4 IN THE ABR INSTALLATION MENU).  
          SEE SECTION 91 FOR DETAILS.  
          -- LASTLY, SCHEDULE AN IPL WITH CLPA FOR THE MODIFICATION TO TAKE EFFECT.  
  
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```

NOTE: Only required if you are running off Version 1 or 2.

CONTINUED . . .

**92.05 CONTINUED . . .****STEP 14 NEW INSTALLATIONS:**

You are now ready to do full testing of the FDR system. [Sections 10](#) through [40](#) of the manual detail the JCL, control statements and options for running FDR, FDRDSF, SAR, CPK and FDRREORG. An installation using ABR will seldom have occasion to execute FDR or FDRDSF directly. [Sections 50](#) through [56](#) of the manual detail the JCL, control statements and options for running ABR, the DASD Management portion of the FDR system.

When the testing of the ABR dialogs has been completed, make them available to other users either by adding the FDR dialog libraries to the TSO Logon Procedure (as described in [Section 92.07](#), item 5), or if LIBDEF services are to be used, please follow the instructions in [Section 92.07](#), item 4.

**92.06 ISPF RELATED PROBLEMS****1) The ABR option is not shown on the ISPF primary options menu.**

1. Was the ABRALLOC CLIST executed on this current TSO session ? If not, exit ISPF and execute the ABRALLOC CLIST.
2. Type the command "PANELID" and hit enter on the ISPF primary options menu ( the very first panel that is displayed by ISPF ). The panel name should appear on the top line on columns 1 thru 8. Is the panel name "ISR@PRIM" ? If not, the problem is that the default ISPF primary options menu is being overridden by another menu; please use the "Procedure to Add the FDR/ABR Option to a Customized ISPF Menu", documented in [Section 92.07](#) item 6.
3. Is ISPF invoked by typing the commands "PDF", "ISPF" or "ISPSTART"? If not, the problem is probably that there is a user-written CLIST or command processor which allocates the ISPF data sets before passing control to ISPF. The user has to modify the CLIST or command processor in order to add the allocation of the FDR ISPF dialog libraries. The FDR ISPF dialog libraries should be allocated as the first library of the concatenation of the following DD-NAMES:
  - 1) SYSPROC – TSO command procedure libraries (CLISTs).
  - 2) ISPLLIB – ISPF dialog panel libraries.
  - 3) ISPMLIB – ISPF dialog message libraries.
  - 4) ISPSLIB – ISPF dialog skeleton libraries.
  - 5) ISPLLIB – ISPF TASKLIB library. The allocation of this ddname is only necessary if the FDR load module library is not placed in the LINKLIST or as a STEPLIB library.

**2) Errors using ISPF ( such as panel or message not found ) after executing the ABRALLOC CLIST.**

This problem is described in item 3 of problem number 1.

**3) Errors using ISPF ( such as display panel, exec error ) after placing the FDR dialog libraries in the TSO Logon Proc.**

A very common problem with data set concatenations is that of differing blocksizes, this problem has 2 solutions:

1. Specify the maximum possible blocksize in the first DD statement on each of the concatenations, for example:
 

```
//SYSPROC DD DI SP=SHR, DSN=I DP. DI ALOG. CLI ST, DCB=BLKSI ZE=32720
```
2. Make sure that FDR dialog libraries have the same or larger blocksizes as the first library in the current concatenation of each of the ddnames used.

**92.07 ABEND CODES AND MISCELLANEOUS**

1. **The attention key interrupts** the installation procedure immediately, causing the data set allocations (if any) to remain active. LOGOFF and re-LOGON to free the existing allocations and restart the installation process.

2. **ABEND System x37:**

Caused by lack of space in the disk data set. Fix the offending data set either by compressing, expanding the directory, allocating more space, moving to another volume or letting the Tape Install program create a new data set.

LOGOFF and re-LOGON to free the existing allocations and restart the installation process.

3. **ABEND System 306:**

This is caused by invoking the Loader under an authorized environment. Get into TSO "READY" mode and reissue the LOAD command specifying the "NAME" parameter, as follows:

**LOAD 'FDR.INSTALL' NAME(INSTALL)**

The "NAME" parameter is needed when the LOAD command has previously failed within the same session; otherwise subsequent LOAD commands will fail because of a duplicate program name.

4. **ISPF LIBDEF Service:**

The FDR ISPF Dialog Libraries may be allocated using the ISPF LIBDEF service (available in ISPF V 2.2 or higher), as follows:

Edit the ISR@PRIM panel and replace the line:

```
A, ' PANEL ( ABRPRI ME ) '
```

with the following lines:

```
A, ' CMD ( EXEC ' ' I DP. DI ALOG. CLI ST ( ABRALLOC ) ' ' +  
    ' ' CMD ( &ZCMD ) ' ' ) NOCHECK '
```

**Note:** All (') characters on the above line are apostrophes, (") represents 2 apostrophes, and not a double quote). Use the data set name of the FDR CLIST Library that was specified in the installation process.

5. **Adding the FDR Dialog Libraries to the Logon Procedure:**

The FDR ISPF dialog libraries should be allocated as the first library of the concatenation of the following DDNAMEs:

- 1) SYSPROC – TSO command procedure libraries (CLISTs), distributed as 'IDP.DIALOG.CLIST'.
- 2) ISPPLIB – ISPF dialog panel libraries, distributed as 'IDP.DIALOG.PANELS'.
- 3) ISPMLIB – ISPF dialog message libraries, distributed as 'IDP.DIALOG.MESSAGES'.
- 4) ISPSLIB – ISPF dialog skeleton libraries, distributed as 'IDP.DIALOG.SKELETON'.
- 5) ISPLLIB – ISPF TASKLIB library. The allocation of this ddname is only necessary if the FDR load module library is not placed in the LINKLIST or as a STEPLIB library.

On systems at levels lower than DFP 2.3.0, a very common problem with data set concatenations is that of differing blocksizes, this problem has 2 solutions:

1. Specify the maximum possible blocksize in the first DD statement on each of the concatenations, for example:

```
//SYSPROC DD DI SP=SHR, DSN=I DP. DI ALOG. CLI ST, DCB=BLKSI ZE=32720
```

2. Make sure that FDR dialog libraries have the same or larger blocksizes as the first library in the current concatenation of each of the ddnames used.

CONTINUED . . .

## 92.07 CONTINUED . . .

**6. Procedure to add the FDR/ABR and SRS options to a customized ISPF menu.**

A. Copy the primary options panel member from the ISPF panel library to the FDR ISPF dialog panel library;

B. Edit the primary options panel member in the FDR ISPF dialog library;

C. Insert the FDR/ABR and SRS options in the displayable section:

```
%----- I SPF/PDF PRI MARY OPTI ON MENU -----
%OPTI ON ==> -- ZCMD
```

```
% 0  +I SPF PARMs- SPECI FY TERMIN AL AND USER PARAMETERS
% 1  +BROWSE - DI SPLAY SOURCE DATA OR OUTPUT LI STI NGS
% 2  +EDI T   - CREATE OR CHANGE SOURCE DATA
% .
% .
% .
% A  +FDR/ABR-      PERFORM SELECTED DASD MANAGEMENT FUNCTI ONS
% S  +FDRSRS -      SEARCH, REPORT, SERVI CES DI ALOG
% .
```

D. Insert the FDR/ABR and SRS options in the )PROC section:

```
.
.
.
) PROC
    &ZSEL = TRANS( TRUNC ( &ZCMD, ' . ' )
                  0, ' PANEL( I SPOPTA ) '
                  1, ' PGM( I SRBRO ) '
                  2, ' PGM( I SREDI T ) '
                  .
                  .
                  .
                  A, ' PANEL( ABRPRI ME ) '
                  S, ' PGM( FDRSRS ) PARM( &ZCMD: &ZAPPLI D: ) NOCHECK +
                     NEWAPPL( FDRS ) PASSLI B'
                  .
                  *, ' ?' )
```

E. Save the panel, exit ISPF and reinvoke ISPF ( in order to refresh the memory copy of the panel ).

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**92.08 CUSTOMIZATION OF THE ABR ISPF DIALOGS**

The ABRGLOBL CLIST consists of global variables that are required for execution of the ABR ISPF dialogs. These globals are currently set to the values utilized at Innovation Data Processing and will not be suitable for execution in your installation. The installation procedure generously over-allocated the CLIST library so that you will not have to compress it right away.

It is possible to directly Edit the member ABRGLOBL in the ABR Dialog CLIST Library, but the recommended method is to use the ISPF panel FDR INSTALLATION -- SET FDR DIALOG GLOBAL OPTIONS (option A.I.10) as described in [Section 92.05](#), Step 10.

Some of the foreground options available through the ABR dialogs utilize system facilities that require the program(s) executed to be authorized via APF (Authorized Program Facility). The global variables that, if enabled, will require authorization are so marked. Suggestions for dealing with the APF requirements under TSO are discussed in [Section 92.10](#), APF Authorization.

**92.09 ABR ISPF DIALOG GLOBAL VARIABLES****GLOBAL  
VARIABLES**

The ABR dialog global variables and their values as distributed appear in the PROC statement at the beginning of the ABRGLOBL CLIST as follows:

```
PROC 0      BACKGRND('YES')          +
            BUNIT(TAPE)              +
            BVOLPFX(FDRTP)           +
            DISKUPDT(DEFAULT)        +
            DOCDSN(IDP.DOCFDR52)     +
            FDRLIB(TLT.FDRLIB.DATA)  +
            FOREGRND('NO')           +
            FSUFIX(SPFCLIST)         +
            FVOL('WRKPK1,WRKPK2')    +
            LIB(IDP.MODFDR52)        +
            REMOTEQ('YES')           +
            RPTEXCL($$)              +
            SCRATCH('A,B,D,IDP,J,L,M,T') +
            SORT(YES)                +
            SORTLIB(SYS1.SORTLIB)    +
            SORTMSG(SYSOUT)          +
            SORTVOL(NONSPEC)         +
            UNIT( )                  +
            XECUT('CALL')
```

It is possible to directly Edit the member ABRGLOBL in the FDR Dialog CLIST library, but the recommended method is to use the ISPF panel FDR INSTALLATION -- SET FDR DIALOG GLOBAL OPTION (option A.I.10), as described in [Section 92.05](#), Step 10.

If you directly Edit the member ABRGLOBL, then the following considerations apply:

The value assigned to any variable may be changed simply by replacing the data within the parentheses with the data required in your installation. For example, to change the value of BACKGRND from YES or NO, code BACKGRND(NO). A word of caution: take care not to remove the + found after all variables but the last. It is used to signify a continued statement. Removing the + will cause the panels to fail when the global variables are retrieved. Also, if a specified value contains imbedded commas or blanks, make sure to enclose it in apostrophes.

Changes to the ABR global variables will take effect immediately for the userid that makes the change, if the change is done via the ISPF panel FDR INSTALLATION -- SET FDR DIALOG GLOBAL OPTIONS (option A.I.10). For other users who have already used any of the ABR processing panels during the current ISPF session, and for the user making the change if via Edit, the change will take effect if the user exits and re-enters ISPF, or if the user does a LOGOFF and re-LOGON.

ABR ISPF support provides for the conditional availability of its functions and processing modes by TSO USERID, as defined by the variables: BACKGRND, FOREGRND, REMOTEQ and SCRATCH. These variables have YES, NO, or a list of TSO USERID GROUPS(UIDG) as their acceptable values. In case of a list of TSO USERID GROUPS is specified, it is compared to the requestor's TSO USERID and always resolved to either YES or NO.

These global variables, in addition to restricting the availability of the function, also control displaying the function on the panels. In other words, if FOREGRND(NO) is specified, the foreground execution option will no longer be offered by those panels that support it.

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## 92.09 CONTINUED . . .

The following is a complete definition of all global variables, their values as shipped, and their use.

- BACKGRND** – Specifies if background (BATCH) execution of FDRABR DUMP or RESTORE operations is permitted. The possible values are YES, NO, or a list of USERID GROUPS (UIDG).
- YES** – Permit function.
- NO** – Function not available.
- 'UIDG1,...,UIDGN'** – Defines the TSO USERID GROUPS of permitted users. Each group name is from 1 to 7 characters. If the requestor's TSO USERID starts with one of these group names, the variable will be set to YES; if not, the variable will be set to NO.
- Value as shipped is YES.
- BUNIT** – Defines the unit name to be use for FDRABR DUMPS and ARCHIVEs that are submitted for background execution. This should be a unit name for tape. (Restores are not affected by the BUNIT global variable.)
- Value as shipped is TAPE.
- BVOLPFX** – This variable normally has no function. It is only used if the installation modifies the ABR ISPF DIALOG support so that restores submitted to the background do not dynamically allocate the backup file (i.e., do not use DYNTAPE). In that case, BVOLPFX defines the dummy tape volume serial number prefix for background submitted FDRABR RESTOREs from backup. A letter from A to Z will be appended to the character string if it is less than six (6) characters in order to prevent volume serial number enqueue conflicts.
- Value as shipped is FDRTP.
- DISKUPDT** – Specifies the processing option for the ARCHIVE and BACKUP functions of the remote queue utility. (This option does not affect restores.)
- Possible values -- YES/NO/DEFAULT
- YES** – Mark the data set directly by updating its DSCB within the VTOC. This option requires APF authorization ([See Section 92.10](#)).
- NO** – Add the BACKUP or ARCHIVE request to a remote queue data set. This option does not require APF authorization.
- DEFAULT** – Default to the value set in the FDR global options table by the DISKUPDATE keyword of FDRZAPOP ([Section 91](#)).
- Value as shipped is DEFAULT.
- DOCDSN** – Specifies the name of the library containing the machine readable version of the FDR User's manual. This library is used by the message query dialog (option A.M). Note: this data set is not the FDR ISPF dialog messages library.
- Value as shipped is IDP.DOCFDR52.
- FDRLIB** – Defines the name of the FDREPORT control statement data set. It is either a sequential or partitioned data set used to store predefined report formats for user execution. For further information [see Sections 53.21](#) and [53.28](#).
- Value as shipped is TLT.FDRLIB.DATA.

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## 92.09 CONTINUED . . .

- FOREGRND** – Specifies if foreground (TSO) execution of FDRABR DUMP and RESTORE operations or FDRCPK (COMPAKTOR) MAP and SIMULATION operations is permitted. The possible values are YES, NO, or a list of USERID GROUPS (UIDG).
- YES** – Permit function.
- NO** – Function not available.
- 'UIDG1,...,UIDGN'** – Defines the TSO USERID GROUPS of permitted users. Each group name is from 1 to 7 characters. If the requestor's TSO USERID starts with one of these group names, the variable will be set to YES; if not, the variable will be set to NO.
- Value as shipped is NO.
- APF authorization is required to execute FDRABR or FDRCPK in the foreground (See Section 92.10).
- FSUFFIX** – Defines the suffix for the POOLDISK data set name that describes the output disk devices to be used when executing a foreground (TSO) FDRABR DUMP for backup or ARCHIVE. For more information see POOLDISK option in Section 51.02. See also the following variable FVOL.
- Value as shipped is SPFCLIST.
- FVOL** – Defines a list of disk volume serial numbers that will be used for the FDRABR.POOLDISK data set, which is a dummy data set that points to the volumes that are eligible to be used as output when executing foreground archive or backup requests. If the global variable FOREGRND is YES during any given execution of the ISPF/PDF panels, the ABRGLOBL CLIST will attempt to locate the POOLDISK data set. If the locate is not successful, the POOLDISK will be allocated to the volume serial number list defined by FVOL.
- Value as shipped is 'WRKPK1,WRKPK2'.
- LIB** – Defines the name of the FDRABR load module library that will be used for background execution, and for foreground execution if and only if the XECUT variable is specified as CALL or 'TSOEXEC CALL'.
- Value as shipped is IDP.MODFDR52.
- NOTE: See XECUT parameter which follows.
- REMOTEQ** – Specifies if the remote queue utility function can be used. The possible values are YES, NO, or a list of USERID GROUPS (UIDG).
- YES** – Permit function.
- NO** – Function not available.
- 'UIDG1,...,UIDGN'** – Defines the TSO USERID GROUPS of permitted users. Each group name is from 1 to 7 characters. If the requestor's TSO USERID starts with one of these group names, the variable will be set to YES; if not, the variable will be set to NO.
- APF authorization (See Section 92.10) is required to use the backup or archive function of the remote queue utility if the DISKUPDT variable is set to YES or defaulted to YES.
- Value as shipped is YES.
- RPTEXCL** – Defines a prefix from one (1) to four (4) characters in length. On the FDRABR REPORT panel, with report option = => 6 (FDREPORT), if the user enters an FDREPORT NAME that starts with this prefix, the user will not be required to enter other information. Otherwise, the user will have to enter a data set name or volume information.
- Value as shipped is \$\$.

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- SCRATCH** – Specifies if the SUPERSCRATCH function of FDRABR is permitted. The possible values are YES, NO, or a list of USERID GROUPS (UIDG).
- YES** – Permit function.
- NO** – Function not available.
- 'UIDG1,...,UIDGN'** – Defines the TSO USERID groups of permitted users. Each group name is from 1 to 7 characters. If the requestor's TSO USERID starts with one of these group names, the variable will be set to YES; if not, the variable will be set to NO.
- Value as shipped is 'A,B,D,IDP,J,L,M,T'.
- WARNING: It is very unlikely that the list of TSO USERID GROUPS that is shipped in the CLIST will be appropriate for your installation. You will almost surely want to change it.
- SORT** Specifies whether DD statements that may be required by the sort program should be allocated for the FDRABR REPORT panel, with: REPORT OPTION = = \$WR'BLANK' (ARCHIVE) or 6 (FDREPORT). The allocations are defined by the variables SORTLIB, SORTMSG, and SORTVOL (see below). If the SORT DD statements are not allocated, FDREPORT reports that request a SORT may fail. The possible values are YES/NO.
- YES** – Allocate SORT DD statements and sort archive reports.
- NO** – Do not allocate SORT DD statements and do not sort archive reports.
- Value as shipped is YES.
- SORTLIB** – Defines the name of the SORT load module library. Specify OMIT if the SORT program at your installation does not use a SORTLIB DD statement. This variable will be ignored if the SORT variable is set to NO.
- Value as shipped is SYS1.SORTLIB.
- SORTMSG** Defines the DDNAME to allocate for SORT output messages. Specify OMIT if you do not wish to have a DD statement allocated for messages from the sort. This variable will be ignored if the SORT variable is set to NO.
- Value as shipped is SYSOUT.
- SORTVOL** – Defines the volume serial number to be allocated to the SORTWKnn temporary data sets. Specify NONSPEC if you want the operating system to allocate the SORTWKnn data sets to any volume available for temporary data sets allocated from TSO. Specify OMIT if you do not wish to have the SORTWKnn data sets allocated. This variable will be ignored if the SORT variable is set to NO.
- Value as shipped is NONSPEC.
- UNIT** – Defines the unit name to use for all allocations of disk work files created by the dialog. Value as shipped is a null string, which causes the allocations to use the unit name specified in the user's entry in the TSO UADS(User Attribute Data Set).

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**XECUT** – Specifies the type of execution service to use when invoking a processing program in the foreground. The provided services are:

**CALL** – Standard CALL support. Use of CALL requires the user to specify a value for LIB.

**'TSOEXEC CALL'** – TSO/E R2.0 authorized CALL support. Requires the user to specify a value for LIB. The command TSOEXEC is documented in the manual: TSO/E Command Language Reference.

**EXEC** – ISPEXEC 'SELECT' service. Any value specified for LIB will be ignored and programs will be obtained from the LINKLIST, STEPLIB, or ISPLLIB data sets.

NOTE: Specification of any other value will result in the value being used as a TSO command, passing the program name and parameters as follows:

SYSCALL PGM 'PARMS'

where XECUT(SYSCALL) was specified

Value as shipped is CALL.

**92.10 APF AUTHORIZATION FOR ABR ISPF DIALOGS****FOREGROUND  
APF AUTHORI-  
ZATION**

Some of the foreground options available through the ABR ISPF dialogs utilize system facilities that require the programs FDRABR, FDRCPK and FDRSRSA (and optionally FDRABRUT) to be executed with APF (Authorized Program Facility) authorization.

**FUNCTIONS  
THAT NEED  
AUTHORIZA-  
TION**

The functions that require APF authorization when performed in the foreground are RESTORE (A.2), ARCHIVE and SUPERSCRATCH (A.3), BACKUP (A.4), and COMPAKTOR MAP or SIMULATE (A.C). All of these functions can also be performed in background or (except COMPAKTOR) via the remote queue; if you specify the ABRGLOBL variable FOREGRND(NO) (Section 92.09), these functions will not be available in the foreground, and you will not have to provide APF authorization, for programs FDRABR and FDRCPK.

ARCHIVE or BACKUP via the Remote Queue (A.3, A.4, A.5) requires APF authorization for program FDRABRUT if the ABRGLOBL variable DISKUPDT (Section 92.09) is specified or defaulted as YES, but not if it is specified as NO.

Additionally, the Search, Report and Services Dialog (A.S.) requires APF authorization for program FDRSRSA.

**PROVIDING  
AUTHORIZA-  
TION UNDER  
TSO**

If you have TSO/E release 2 or higher, you can provide APF authorization for the ABR programs to run under ISPF by

- (a) specifying the ABRGLOBL CLIST variable XECUT('TSOEXEC CALL') or XECUT(EXEC) (Section 92.09), and
- (b) updating the appropriate TSO authorized program table, as discussed below. XECUT(EXEC) will provide authorization only if you also have ISPF version 2 or higher.

**IEAAPFxx**

If you specify the ABRGLOBL CLIST variable XECUT('TSOEXEC CALL'), the FDR load module library must be APF authorized by being listed in 'SYS1.PARMLIB(IEAAPFxx)', even if the FDR load module library is in the LINKLIST.

If you specify the ABRGLOBL CLIST variable XECUT(EXEC), then the FDR load module library must be either

- (a) in a linklist library that is APF authorized, or
- (b) allocated to the STEPLIB DDNAME in the LOGON PROC. Additionally, the FDR load module library and any other libraries that may be concatenated under the STEPLIB DDNAME must be listed in 'SYS1.PARMLIB(IEAAPFxx)', even if they are also in the LINKLIST.

If you do not have TSO/E version 1 release 2 (1.2.0) or higher, then in order to allow the ABR programs to run as APF authorized, you must install the FDRAUTH Authorized Program Load Utility (documentation for this facility, which also requires an SVC that is supplied by INNOVATION, is available upon request).

**TSO  
AUTHORIZED  
PROGRAM  
TABLE**

Programs that are allowed to run with APF authorization under TSO must be listed in the TSO Authorized Program Table. As discussed above, you must add the program names FDRABR, FDRCPK, FDRSRSA, and optionally FDRABRUT to the appropriate table. (FDRABRUT needs to be added only if the ABRGLOBL CLIST variable DISKUPDT is specified or defaulted as "YES")

Starting with TSO/E release 4, the list of authorized programs may be specified in member IKJTSO00 in SYS1.PARMLIB. The old method of changing the table within a load module in the Link Pack Area is still supported. The authorized program lists are documented in the IBM manual "TSO/E Customization".

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## 92.10 CONTINUED . . .

**UPDATING  
IKJTSO00**

If your installation uses the IKJTSO00 member, then add the FDR program names to both AUTHPGM and AUTHTSF NAMES lists. If not, then use the table below to determine the CSECT(s) and LOAD module to change. In order for the changes to IKJTSO00 to take effect, either an IPL is required or the TSO command PARMLIB UPDATE(00) may be used to update the incore version of IKJTSO00. (The PARMLIB command is available in TSO/E Version 2 and higher.)

The CSECT name(s) and load module of the table that must be updated for various levels of MVS and TSO/E are as follows:

<b>Operating System</b>	<b>TSO</b>	<b>Load Module</b>	<b>CSECT(s)</b>
MVS/XA+	TSO/E R3+	IKJTABLS	IKJEFTE8 and IKJEFTAP
MVS/XA+	TSO/E R2.1	IKJTABLS	IKJEFTE8
MVS/XA+	TSO/E R2.0	IKJEFT02	IKJEFTE8
MVS/370	TSO/E R3+	IKJEFT02	IKJEFTAP
MVS/370	TSO/E R2+	IKJEFT02	IKJEFTE8

“+” means “or higher”

An IPL with CLPA is required for the updated TSO authorized program table to take effect.

When you specify the ABRGLOBL CLIST variable XECUT('TSOEXEC CALL'), the table that you update is the table used by the TSO CALL command; updating this table will also authorize the programs to be invoked by the TSO CALL command outside of ISPF.

The authorized program tables are documented in the IBM manuals “System Programming Library: TSO” and “System Programming Library: TSO/E User Exits and Modifications Volume 2”

**92.50 DYNAMIC INSTALLATION OF THE FDR/ABR MVS EXITS -- INTRODUCTION**

The FDR system includes several Operating System exits. Although these exits are not required for ABR to function, they provide very important additional functions.

For MVS users running MVS/ESA, MVS/XA, or MVS/370 system levels SP 1.2 or higher, the recommended method for installing the ABR Operating System exits is by the dynamic installation procedure described in this and the following Sections.

**DYNAMIC  
INSTALL-  
ATION —  
ADVANTAGES**

The dynamic installation process is transparent to other system functions. The FDR/ABR Operating System exits are installed at standard user exit points provided by MVS, and are designed to co-exist with other user exits which may already be in use.

The dynamic installation process enables the FDR/ABR Operating System exits to be automatically installed at IPL time and to remain throughout the life of the IPL. Once installed, the ABR exits may be deactivated and reactivated, possibly with different installation options. The dynamic installation procedure increases system integrity and reliability. Additionally, it speeds up and simplifies the installation and maintenance of the FDR/ABR exits.

**EXITS THAT  
ARE  
INSTALLED  
DYNAMICALLY**

The FDR/ABR MVS exits that are available for dynamic installation are the CATALOG LOCATE exit and the Data Set Not Found exit, which implement the Automatic Recall feature of ABR, and the DADSM Pre-processing exit and the FDRREORG IEBCOPY INTERCEPT.

**EXITS FOR  
AUTOMATIC  
RECALL**

The ABR CATALOG LOCATE exit (module FDR026DU) and the ABR Data Set Not Found exit (module FDREXDSN) implement the Automatic Recall feature of ABR, which is discussed in detail starting in [Section 52.20](#). With these exits installed, a reference, from either a batch job or a TSO user, to a data set that has been ARCHIVED, will cause the data set to be automatically restored. If these exits are not installed, any restore of an ARCHIVED data set must be explicitly requested.

**DADSM PRE-  
PROCESSING  
EXIT**

The purpose of the ABR DADSM Pre-processing exit (module FDRPRE00) is to record ABR backup information in the ABR SCRATCH catalog for any data sets that are SCRATCHed or RENAMED by programs other than FDRABR and that have ABR backups. With the DADSM Pre-processing exit installed, a user can request the restore of a data set that has been SCRATCHed or RENAMED simply by specifying the data set name. If this exit is not installed, the user must tell ABR the generation and cycle on which the data set was backed up.

Also, when a data set is RENAMED, the DADSM Pre-processing exit clears the ABR backup indicators, to indicate that the data set has not been backed up under the new name. Also, when a new data set is allocated, or when a data set is extended to a new volume, this exit initializes the last reference date.

Further details on the DADSM Pre-processing exit appear in [Section 92.60](#).

**FDRREORG  
IEBCOPY  
INTERCEPT**

FDRREORG optimizes the IEBCOPY compress-in-place operation providing substantial savings in elapsed time and resource consumption. FDRREORG is a cost option of the FDR system.

Further details on the FDRREORG IEBCOPY INTERCEPT appear in [Section 92.65](#).

**ICF VSAM  
MODIFICA-  
TION**

In addition to the above exits, the ABR system provides an ICF VSAM modification to record the Update Indicator and the Last Reference Date for VSAM data sets. This modification (to module IDATMSTP) applies to systems with MVS/370 DFP or MVS/XA DFP (Version 1 or 2); the modification should not be installed under MVS/DFP Version 3 or higher, because then the function is automatically included in the Operating System. This modification is not available for dynamic installation, but must be installed with SMP, in order to guarantee the continued time stamping of ICF VSAM data sets in IPLs where dynamic installation does not take place. The procedure for installing this modification with SMP using the interactive installation procedure appears in [Section 92.05](#), Step 13 (ISPF option A.I.13.3). The procedure for installing this modification with SMP using the batch installation procedure appears in [Section 90.12A](#).

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**92.51 DYNAMIC INSTALLATION OF THE FDR/ABR MVS EXITS -- SETUP AND CONTROLS****STEP 1 —  
REMOVE SMP  
EXITS**

**Installations where the ABR exits are SMP installed must remove these ABR exits before attempting dynamic installation.** Remove the ABR exits from the system using the SMP procedures documented in [Section 92.05](#), Step 13 (ISPF option A.I.13), or Sections 90.11, 90.12, and 90.12B, of the manual for the release from which the exits were installed.

If the ABR SCRATCH exit is installed, remove the SCRATCH module(s) and their aliases from the modified link pack area (MLPA).

- If the modules required by the ABR SCRATCH exit were the only modules in MLPA, then remove the MLPA= parameter from member IEASYS00 in data set SYS1.PARMLIB.
- If other modules are needed in MLPA, but the modules required by the ABR SCRATCH exit are in a separate IEALPAXX member by themselves, then remove the ID of that IEALPAXX member from the MLPA= parameter in member IEASYS00.
- If other modules are needed in MLPA, and the modules required by the ABR SCRATCH exit are in an IEALPAXX member that also contains other modules, then remove the ABR modules from that IEALPAXX member.
- For MVS/ESA and MVS/XA systems, if other modules are needed in MLPA, and the ABR SCRATCH exit was the only reason for specifying NOPROT, then remove the NOPROT option from the MLPA= parameter in member IEASYS00.

NOTE: If the ABR Operating System exits from FDR/ABR V 5.0E or later are dynamically installed in your system in production, please go to [Section 92.52](#), page 1560, for the procedure to test a new version of the exits.

**STEP 2 —  
SET EXIT  
OPTIONS**

Set the dynamic installation options via the ISPF panel FDR INSTALLATION — SET DYNAMIC INSTALLATION OPTIONS (option A.I.4.11.1), or via the FDRZAP utility. If using FDRZAP, these options are specified as operands of the ENABLE or DISABLE keyword (ex: ZAP ENABLE=(ABRLOC,ABRDSNF,ABRPRE,IEBCOPY) ).

**ABRLOC** Specifies whether the ABR CATALOG LOCATE exit is to be dynamically installed (or activated) by FDRSTART.

The default is that this option is not enabled.

**ABRDSNF** Specifies whether the ABR Data Set Not Found exit is to be dynamically installed (or activated) by FDRSTART.

The default is that this option is not enabled.

**ABRPRE** Specifies whether the ABR DADSM Pre-processing exit is to be dynamically installed (or activated) by FDRSTART.

The default is that this option is not enabled.

**IEBCOPY** Specifies whether the FDRREORG IEBCOPY INTERCEPT is to be dynamically installed (or activated) by FDRSTART.

The default is that this option is not enabled.

NOTE: The above four options will take effect on the next execution of FDRSTART, either at IPL time or in a batch job.

**CONFINST** Specifies whether the console operator will be requested to confirm the dynamic installation of the ABR exits.

The default is that this option is not enabled.

Various options may also be set to modify the processing done by the exits. These options are set via the ISPF panels:

FDR INSTALLATION -- SET ABR GLOBAL AUTO-RECALL OPTIONS (option A.I.4.11.2);  
FDR INSTALLATION -- MORE ABR GLOBAL AUTO-RECALL OPTIONS (option A.I.4.11.3);  
FDR INSTALLATION -- SET ABR DSN NOT FOUND-EXIT OPTIONS (option A.I.4.11.4); and  
FDR INSTALLATION -- SET ABR DADSM PRE-EXIT OPTIONS (option A.I.4.11.5); or via the FDRZAP utility.

For details, See [Section 92.05](#) Step 4, [Section 52.20](#), and "Options" in [Section 92.60](#).

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**92.51 CONTINUED . . .**

**STEP 2 (continued)** Under MVS/ESA, if the FDR load module library is already in LINKLIST (so that you do not have to do Step 3), then after you set the options, do a MODIFY LLA,REFRESH, or preferably MODIFY LLA,UPDATE=xx, to inform the Operating System that module FDROPT has changed.

If you change any of the options that affect the exits, after the exits are dynamically installed, and you want the changes to take effect before the next IPL, you must run FDRSTART, as discussed in Step 8.

**STEP 3 -- LINKLIST** Place the FDR load module library in a LINKLIST library that is APF authorized, if you have not already done so. Under MVS/XA, do a MODIFY LLA,REFRESH; under MVS/ESA, do a MODIFY LLA,REFRESH, or preferably MODIFY LLA,UPDATE=xx.

**STEP 3A -- CATALOGED PROCEDURE** If you will be installing the CATALOG LOCATE exit, and you have not previously copied the 'SYNRECAL' cataloged procedure **from V 5.2**, then copy the cataloged procedure 'SYNRECAL' from the Installation Control Library to a cataloged procedure library that is available to JES for START commands. Edit this member and remove the STEPLIB DD statement, since the FDR load module library is in the LINKLIST. You may give this cataloged procedure a name other than 'SYNRECAL'; if so, change the value for the LXSYNPROC option on ISPF panel A.I.4.11.2, or execute program FDRZAPOP with the command ZAP LXSYNPROC=procname.

**STEP 4 -- ACTIVATE EXITS** During testing, the FDR/ABR exits may be dynamically installed by executing a batch job using the following JCL:

```
//FDRSTART JOB ' DYNAMI CALLY I NSTALL FDR/ABR EXI TS' , FDR
//FDRSTART EXEC PGM=FDRSTART
//ABNLDUMP DD DUMMY FOR ABEND- AI D
//SYSUDUMP DD SYSOUT=A
```

This JCL is supplied in member FDRSTART in the Installation Control Library (loaded as described in [Section 92.03](#) or [90.02](#)).

Note: In case of abnormal termination or errors, the dynamic installation program error recovery routine will issue a diagnostic message to the console operator and deactivate the FDR/ABR exits which were installed (if any).

During testing, run jobs to test the function of the FDR/ABR exits. Please consult [Section 92.52](#) for test guidelines.

After running the above job, the exits will remain active until the next IPL of your Operating System. After an IPL, you may run the job again to reactivate the exits. When you are ready to have the exits activated automatically during each IPL, see Step 7.

**STEP 5 -- STATUS** This step is optional. The status of the dynamically installed FDR/ABR exit modules may be obtained by executing a batch job using the following JCL:

```
//FDRSTATS JOB ' REPORT STATUS OF ABR EXI TS' , FDR
//FDRSTATS EXEC PGM=FDRSTATS
//ABNLDUMP DD DUMMY FOR ABEND- AI D
//SYSUDUMP DD SYSOUT=A
```

This JCL is supplied in member FDRSTATS in the Installation Control Library (loaded as described in [Section 92.03](#) or [90.02](#)).

CONTINUED . . .

## 92.51 CONTINUED . . .

**STEP 6 --  
DEACTIVATE  
EXITS**

This step is not normally needed.

If the dynamically installed FDR/ABR exits are deactivated, their processing will be completely bypassed, causing all requests to be ignored, as if the FDR/ABR exits were not installed. An IPL is required to completely remove the ABR exits from the system. Normally, the FDR/ABR exits should remain active for the life of the IPL. There is no need to deactivate the ABR exits when shutting down the system.

All of the dynamically installed FDR/ABR exit modules may be deactivated by executing a batch job using the following JCL:

```
//FDRPARE      JOB      ' DEACTI VATE  FDR/ABR  EXI TS' , FDR
//FDRPARE      EXEC     PGM=FDRPARE
//ABNLDUMP     DD       DUMMY              FOR ABEND-AI D
//SYSUDUMP     DD       SYSOUT=A
```

The FDR/ABR exit modules may be reactivated by re-executing the FDRSTART program.

Individual exits may be deactivated without interfering with the operation of other exits that you want to keep running, by turning off the appropriate dynamic installation option (ABRLOC, ABRDSNF, ABRPRE and/or IEBCOPY) and rerunning FDRSTART. Step 2 describes the dynamic installation options, Step 8 discusses the procedure for changing the options, and Step 4 shows the JCL for FDRSTART. An exit that has been deactivated in this way may be reactivated by changing the dynamic installation option back and rerunning FDRSTART again.

**STEP 7 --  
PRODUCTION**

After preliminary testing, the dynamic installation of the FDR/ABR exits should automatically take place as part of each IPL.

To accomplish this, put the following record (starting in column 1) into an IEFSSNxx member in data set SYS1.PARMLIB:

```
FDR, FDRSTART
```

You may either add this record to an existing IEFSSNxx member, or put this record into a new IEFSSNxx member and add the new member's suffix to the SSN= parameter in IEASYSxx. This IEFSSNxx record will cause the FDRSTART program to run during every IPL, as a subsystem initialization routine, to dynamically install the ABR Operating System exits. In the current release, FDR/ABR will not actually be started as an MVS subsystem.

For the first IPL after updating IEFSSNxx, it is a good idea to set the CONFINST option in the FDR Global Options Table to cause the console operator to be asked to confirm whether the dynamic installation of the ABR Operating System exits should take place. Then, in case the IPL fails, the next IPL can be performed without the use of dynamic installation.

CONTINUED . . .

## 92.51 CONTINUED . . .

**STEP 8 —  
CHANGING  
OPTIONS**

If you change any of the global options in the FDR/ABR system, after the ABR Operating System exits are dynamically installed, and you want the changes to take effect before the next IPL, you must run FDRSTART, using the procedure below.

NOTE: This does not apply if only the FDRREORG IEBCOPY INTERCEPT is dynamically installed and the ABR exits are not dynamically installed.

This rule applies to all options, not just the options that affect the exits themselves. The reason is that the dynamic installation procedure loads FDROPT, the load module in which all of the options are stored, into the Active Link Pack Area. The ISPF dialogs, or FDRZAPOP, change FDROPT in the program library, but FDRSTART is needed to move the changes to the copy of FDROPT in the Active Link Pack Area. (This rule does not apply to the COMPAKTOR Unmovable Table, the ABR PROTECT lists, or the ABR RESTORE Allocation Control List, which are not part of FDROPT.)

- A. Change the desired options, using the ISPF panels or FDRZAPOP.
- B. Under MVS/ESA, issue the operator command MODIFY LLA,REFRESH, or preferably MODIFY LLA,UPDATE=xx, to inform the Operating System that module FDROPT has changed.
- C. Execute FDRSTART in a batch job, using the JCL shown in Step 4. This may be done at any time, even if the exits are normally installed at IPL time using IEFSSNxx as shown in Step 7. When program FDRSTART sees that the dynamically installed exits have already been activated, it does not reload the exit modules, but it does update FDROPT.
- D. If you have more than one system, do Steps B. (for MVS/ESA only) and C. on every system.

**92.52 TESTING THE FDR/ABR MVS EXITS**

Here are some suggestions for tests that you may run to verify that the ABR Operating System exits are installed and operating correctly.

**TESTING ABR  
CATALOG  
LOCATE EXIT**

Run batch jobs and execute TSO commands that reference data sets which have been archived for automatic recall. Make sure not to specify volume serial information, which causes the catalog to be bypassed. Verify that the referenced data sets are automatically restored.

**TESTING ABR  
DATA SET NOT  
FOUND EXIT**

Run batch jobs (such as IEBGENER) that OPEN data sets which have been archived, making sure to specify volume serial information in the DD statement, so that the ABR CATALOG LOCATE exit will not recall the data sets, and the ABR Data Set Not Found exit will be invoked. Verify that the OPENed data sets are automatically restored.

**TESTING ABR  
DADSM PRE-  
PROCESSING  
EXIT**

SCRATCH data sets which have been backed up by ABR. Verify that the SCRATCHed data sets are recorded in the ABR SCRATCH catalog: either by using the ISPF dialog for the ABR SCRATCH Catalog Report (ISPF option A.1.3), or by using program FDRABRP with the PRINT SCRATCH command.

RENAME data sets which have been backed up by ABR. Verify that the old data set names are recorded in the SCRATCH catalog, as above. Also verify that the renamed data sets show as not having an ABR backup: either by using the ISPF dialog for the ABR BACKUP Report (ISPF option A.1.2), or by using program FDRABRP with the PRINT BACKUP command.

Allocate new data sets and DEFINE new VSAM clusters. Before ever OPENing these data sets, verify that the last reference dates have been correctly set: either by using the ISPF dialog for the ABR BACKUP Report (ISPF option A.1.2), or by using program FDRABRP with the PRINT BACKUP command.

**TESTING  
FDRREORG  
IEBCOPY  
INTERCEPT**

Run an IEBCOPY compress of a PDS and verify that the SYSPRINT output contains FDR messages, instead of IEBCOPY messages. Include a STEPLIB DD pointing to the FDR load library unless it is in the LINKLIST. Next, include an //NFDRCOPY DD DUMMY in the JCL stream and rerun the job to verify that IEBCOPY is successfully invoked.

\* \* \*

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## 92.52 CONTINUED . . .

**TESTING A  
NEW VERSION**

If the ABR Operating System exits from FDR/ABR V 5.0E or later are dynamically installed in your system in production, it is possible to test a new version of the exits, or a change in options, for a specified set of jobs, while continuing to use the production version of the exits for other jobs.

The procedure to do this is as follows:

**A. LIBRARY  
FOR TEST**

Create a test library. This library must be APF-authorized. This library may be any of the following:

- a complete library for a new release of FDR/ABR.
- a complete copy of the library for the current release of FDR/ABR.
- a partial library for either a new release or the current release. This library must contain at least the following modules: FDRSTART, FDROPT, FDRVECTB, and whichever exit modules (FDR026DU, FDREXDSN, FDRPRE00 and FDRBCOPY) will be dynamically installed for this test.

**A.1  
CATALOGED  
PROCEDURE**

If you will be testing the CATALOG LOCATE exit, and you have not previously copied the 'SYNRECAL' procedure **from V 5.2** then copy the cataloged procedure 'SYNRECAL' from the Installation Control Library to a cataloged procedure library that is available to JES for START commands. Edit this member and specify the dsname of the test library on the STEPLIB DD statement.

If you already have a 'SYNRECAL' procedure in the cataloged procedure library, and (a) it is from a release prior to V 5.1; or (b) you are testing a new version of the CATALOG LOCATE exit, and you wish to, or are required to, run the new version of the exit with the FDR/ABR program library at a corresponding release level; or (c) you are testing a change of options, and the changed options affect the programs (e.g. FDRABR) as well as the exits; then the test will require a separate copy of the SYNRECAL cataloged procedure, under a different name. In this case, you must change the value for the LXSYNPROC option on ISPF panel A.I.4.11.2, or execute program FDRZAPOP with the command ZAP LXSYNPROC=procname. Be sure to change this option in the test library, as discussed in the next step, and not in the production library.

If you already have a 'SYNRECAL' procedure in the cataloged procedure library, and the conditions in the preceding paragraph do not apply, then you do not have to do anything special, and the test version of the exits will use the same SYNRECAL procedure as the production version of the exits.

**B. OPTIONS  
FOR TEST**

Set the desired options in the test library. If you use the ISPF dialogs, be sure to specify the name of the test library on panel A.I.4. If you use FDRZAPOP, be sure to specify the name of the test library on the SYSLIB DD statement. If you are testing an option change, then of course some options in the test library will be different from the production version. If you are testing a new version of the exits, then all of the options may be the same as for the production version, and this step may not be necessary.

It is not necessary to specify the same exits to be dynamically installed for testing as for production. If you are testing a new version of a particular exit, or a change in an option that affects only one exit, then it is appropriate to set the options in the test library to dynamically install only that exit. For example, you could set ABRLOC to YES and set ABRDSNF and ABRPRE to NO in the test library, even though all three options are set to YES in the production library in LINKLIST. On the other hand, if you are testing an exit that you have never used before, you would set the option to install that exit to YES in the test library even though it is NO in the production library in LINKLIST.

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## 92.52 CONTINUED . . .

**C. INSTALL  
FOR TEST**

Dynamically install the test version of the exits by executing a batch job using the following JCL:

```
//FDRSTRTT JOB ' DYNAMI CALLY I NSTALL TEST VERSI ON OF EXI TS' , FDR
//FDRSTRTT EXEC PGM=FDRSTART,
// PARM=' TEST, JOBNAME= j obname|j obgroup*' See Note 1
//STEPLI B DD DSN=fdrabr. test. l i brary, DI SP=SHRSee Notes 2&3
//SYSLI B DD DSN=fdrabr. test. l i brary, DI SP=SHRSee Note 3
//ABNLDUMP DD DUMMY FOR ABEND-AI D
//SYSUDUMP DD SYSOUT=A
```

This JCL is supplied in member FDRSTRTT in the Installation Control Library (loaded as described in [Section 92.03](#) or [90.02](#)).

Note 1: On the EXEC statement, JOBNAME= specifies the job(s) that are to be processed by the test version of the exits. JOBNAME= may be abbreviated as JOB=. The value specified may be either a single jobname, or a group name specified as a jobname prefix followed by an asterisk (\*). TSO userids and started task names will also be checked for a match and will be eligible for processing by the test version of the exits. Any job that does not match will be processed by the production version of the exits. If JOBNAME=\* or JOB=\* is specified, then all jobs will be processed by the test version of the exits; in effect, the production version of the exits will be temporarily replaced.

For compatibility with earlier releases, JOBG= and JOBGROUP= will also be accepted, and will be treated as JOBNAME= with an asterisk at the end of the operand.

Note 2: The STEPLIB DD statement is not needed if the test library is the same version and level as the FDR load library in LINKLIST.

Note 3: The SYSLIB DD statement, and, if used, the STEPLIB DD statement must specify the dsname of the test library, created as discussed above in Step A.

**D. ABRLIB/  
STEPLIB FOR  
TEST**

If you are testing a new version of the CATALOG LOCATE exit and/or the Data Set Not Found exit, and you wish to, or are required to, run the new version of the exit with the FDR/ABR program library at a corresponding release level; or if you are testing a change of options, and the changed options affect the programs (e.g. FDRABR) as well as the exits; then:

- the jobs (or TSO users or started tasks) that are processed by the new version of the exit, and that directly invoke programs from the ABR program library, must include an ABRLIB DD statement pointing to the new program library. For the CATALOG LOCATE exit, this rule applies to automatic recalls done in the foreground under TSO, to automatic recalls done for batch jobs under the initiator or under dynamic allocation, and to recall requests routed to the remote queue under TSO. For the Data Set Not Found exit, this rule applies to all recalls.
- the started tasks and batch jobs that perform external restores for jobs (or TSO users or started tasks) that are processed by the new version of the exit, must include a STEPLIB DD statement pointing to the new program library. This rule applies to the cataloged procedure used for background recalls requested by TSO users and for other synchronous and asynchronous external recalls (name specified by LXSYNPROC option, default SYNRECAL), and to the batch job that does the restores from the remote queue.

For all functions of the V 5.2 exits to run correctly, the program library must also be from V 5.2.

Technical note: The copy of FDROPT that is used by the test version of the exits is loaded into CSA for use by the exits, but it is not pointed to by the Active Link Pack Area queue. Therefore it is available only to the exits; the programs will use the production version of FDROPT unless an ABRLIB (or STEPLIB) points to a library containing a different version.

CONTINUED . . .

## 92.52 CONTINUED . . .

**E. CHANGING  
OPTIONS FOR  
TEST**

Once a test version is running, you must specify PARM=TEST or PARM=PROD for every execution of FDRSTART until the next IPL.

Example 1. You have tested the CATALOG LOCATE exit with a new option, and now you want to test it with a different new option.

- a. Change the desired option(s) in the test library, using the ISPF panels or FDRZAPOP.
- b. For MVS/ESA only: Usually the test library should not be under the control of Library Lookaside. But if it is, then issue the operator command MODIFY LLA,REFRESH, or preferably MODIFY LLA,UPDATE=xx, to inform the Operating System that module FDROPT has changed.
- c. Execute a batch job, using the following JCL:

```
//FDRCHOPT JOB' CHANGE OPTIONS FOR TEST ABR EXITS' , FDR
//FDRSTART EXEC PGM=FDRSTART, PARM=TEST
//STEPLIB DD DSN=fdrabr.test.library, DISP=SHR See Note 1
//SYSLIB DD DSN=fdrabr.test.library, DISP=SHR
//ABNLDDUMP DD DUMMY FOR ABEND-AID
//SYSUDUMP DD SYSOUT=A
```

Note 1: The STEPLIB DD statement is not needed if the test library is the same version and level as the FDR load library in LINKLIST.

FDRSTART will replace the copy of FDROPT used by the test version of the exits with the copy that it reads from the test library (pointed to by the SYSLIB DD statement).

Since the JOBNAME parameter was not specified, the test will continue for the same job name(s) as were specified on the previous FDRSTART.

- d. Usually you will be running the test version on only one system at a time. But if you are running the test on more than one system, do steps b. (for MVS/ESA only) and c. on every system where you are running the test.

Example 2. You have tested the DADSM Pre-processing exit with one set of jobs, and now you want to test it with a different set of jobs.

Execute a batch job, using the following JCL:

```
//FDRCHOPT JOB ' CHANGE JOBNAMES FOR TEST ABR EXITS' , FDR
//FDRSTART EXEC PGM=FDRSTART, PARM=' TEST, JOBNAME=j obname
                                     j obgroup*'
//STEPLIB DD DSN=fdrabr.test.library, DISP=SHR See Note 1
//SYSLIB DD DSN=fdrabr.test.library, DISP=SHR
//ABNLDDUMP DD DUMMY FOR ABEND-AID
//SYSUDUMP DD SYSOUT=A
```

Note 1: The STEPLIB DD statement is not needed if the test library is the same version and level as the FDR load library in LINKLIST.

The test version of the exits will now process the job(s) specified by the new FDRSTART PARM value. The job(s) that were previously being processed by the test version of the exits will now be processed by the production version of the exits.

Also, FDRSTART will replace the copy of FDROPT used by the test version of the exits with the copy that it reads from the test library (pointed to by the SYSLIB DD statement); there may or may not have been any changes in FDROPT.

Example 3. You have tested the exits with a new option, and now you want to install the new option into production.

Follow the procedure in [Section 92.51](#) Step 8, except that the EXEC statement must specify:

```
//FDRSTART EXEC PGM=FDRSTART, PARM=PROD
```



**92.60 ABR DADSM PRE-PROCESSING EXIT**

This Section presents a more detailed description of the function of the ABR DADSM Pre-processing exit than the previous Sections. You do not have to read this Section in order to install or use ABR effectively.

The main purpose of the DADSM Pre-processing exit (module FDRPRE00) is to create entries in the ABR SCRATCH catalog.

**ABR SCRATCH CATALOG**

What is the ABR SCRATCH catalog? It is a set of entries within the ABR catalog. SCRATCH entries start with a high-level index of '#', are created by the ABR DADSM Pre-processing exit, and are used to record information about where a data set was backed up, after the data set has been SCRATCHed.

(The other set of entries in the ABR catalog is called the ABR backup catalog. Backup entries start with a high-level index of 'FDRABR', and represent the backup files created by the ABR system. The ABR catalog is an ICF VSAM catalog containing these two sets of entries. Procedures for creating the ABR catalog appear in [Section 92.05](#) Step 7, and in [Sections 90.16](#) through [90.19](#).)

The ABR SCRATCH catalog should be maintained by regularly running the PURGE SCRATCH command of program FDRABRCM ([See Section 55.22](#)).

Why does ABR need a SCRATCH catalog? To understand this, we must review how ABR knows what tape to use for a restore from backup.

**HOW ABR FINDS BACKUP TAPES**

Suppose that a user wants to restore a data set from a backup copy. Suppose further that the data set still exists on disk, although the information in the data set is no longer valid. All the user has to do is to go to the FDRABR RESTORE PANEL or the FDRABR REMOTE QUEUE PANEL (ISPF option A.2 or A.5), specify that the restore is from Backup rather than ARCHIVE, fill in the data set name, and hit Enter. The design of ABR is that the user should not have to contact a central DASD support group to get his data set restored, and should not have to know the dsname or tape volume containing the backup. Instead, the ABR system should figure all this out.

**— DATA SET ON DISK**

How does ABR identify the backup tape to use for restoring a requested data set? ABR has a backup catalog, which contains an entry for each backup file. However, there is no way to tell from the backup catalog whether a given disk data set was backed up on a given backup file, because one backup file contains all of the data sets backed up from one disk volume in one run, and on an incremental backup, only the updated data sets, not all data sets, are backed up. Unlike some other DASD management systems from other vendors, ABR does not have a large data base with an entry for every data set that has been backed up. Instead, for as long as a data set is on disk, ABR maintains WITHIN THE VTOC all the information it needs to identify the backups for that data set. Within the data set's own DSCB, ABR records the most recent cycle on which that data set was backed up, and (if the OLDBACKUP feature is enabled for that volume — [see Section 92.05](#) Step 8 or [Section 90.24](#) or [Section 55.04](#)) up to 13 previous cycles. Within the ABR model DSCB, ABR records the current generation number for the disk volume. Every backup created by the backup subsystem of ABR has a unique dsname containing the generation number and cycle number ([See Section 52.05](#)). When the user requests a restore for a particular data set, ABR:

- (1) does a LOCATE, to find out, from the catalog, the volume on which the data set resides;
- (2) reads the DSCB for the data set to find out the most recent backup cycle for the data set, or, if the user requested OLDBACKUP=, to find out the cycle number corresponding to the specified OLDBACKUP;
- (3) reads the ABR model DSCB on the volume to find out the current generation number;
- (4) uses the disk volume serial number, generation number, and cycle number to construct the dsname of the backup data set, in the form FDRABR.Vvvvvvv.Ccggggnn;
- (5) does a LOCATE from the ABR backup catalog for that backup dsname, to find out the tape volume serial(s) and file sequence number;
- (6) calls for a mount of that tape, OPENS that tape file, and restores the user's data set.

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## 92.60 CONTINUED . . .

**— DATA SET  
HAS BEEN  
SCRATCHED**

BUT, what if a data set set has been SCRATCHed? In that case, the data set no longer has a DSCB in the VTOC. If the ABR DADSM Pre-processing exit were not installed, ABR would have no way of identifying the backup containing the data set, and the user requesting the restore would have to specify the volume serial and the generation and cycle number. However, with the DADSM Pre-processing exit, ABR uses the ABR SCRATCH catalog to record the backup information that was stored in the VTOC while the data set was on disk. So, after step (1) above, if ABR finds that the data set is not cataloged, ABR looks for the data set in the ABR SCRATCH catalog, by doing a LOCATE on a dsname consisting of '#' followed by the real dsname. If ABR finds a SCRATCH entry, then ABR uses that entry to get the cycle number and generation number, as well as the disk volume serial number, and then continues at step (4) above.

**LIMITATION**

If a data set is SCRATCHed and its dsname is 43 or 44 bytes long, it will not be recorded in the ABR SCRATCH catalog. To be recorded, the dsname of the real data set must be no longer than 42 characters, so that there is room to add the prefix of '#'.

\* \* \*

**RENAME**

When a data set is RENAMEd, it is equivalent, from the point of view of the backup subsystem of ABR, to creating a new data set with the new name and deleting (SCRATCHing) the data set with the old name. The ABR DADSM Pre-processing exit (see Note below) handles RENAMEs accordingly. The exit records the old name in the ABR SCRATCH catalog as though the data set had been SCRATCHed; and the exit clears the ABR backup indicators in the DSCB for the RENAMEd data set on disk, to indicate that the data set has not been backed up yet under the new name. Thus, if a user wants to restore the data set from before it was RENAMEd, he requests it by the old name, and ABR obtains the backup information from the SCRATCH catalog. The restore can either recreate the data set under the old name (by default), or can write over the new-name data set (if NEWNAME/NEWGROUP/NEWINDEX is specified). After the RENAME, the data set will be backed up on the next ABR backup run. If a user wants to restore the data set from after it was RENAMEd, he requests it by the new name. As the new-name data set is updated and is backed up additional times, its OLDBACKUPS will correctly only extend back as far as the RENAME.

Note: For RENAMEs, the ABR exit actually is implemented as a DADSM *Post-processing* exit. That is, the exit gains control after the data set has been physically renamed in the VTOC. In this way, the exit avoids taking inappropriate actions if the Operating System rejects the RENAME request because of conditions that may be checked for after the point at which the Pre-processing exit gains control, such as security violations or the data set being OPEN.

**LAST  
REFERENCE  
DATES**

Another function of the ABR DADSM Pre-processing exit is related to the ARCHIVE subsystem of ABR. The ARCHIVE subsystem has the capability of removing data sets from disk when they have not been used for a certain amount of time (the amount is specified by the installation). This function depends on the last reference date in the format 1 DSCB in the VTOC. When a data set is allocated, its last reference date starts out as zero. The last reference date is updated by the Operating System when a data set is OPENed. However, if a data set is allocated on disk and is never OPENed, the Operating System will never set its last reference date. If the data set is located on a pack that gets backed up through the ABR backup subsystem, then ABR will back up the data set on the next backup run, and will set the data set's last reference date to the date of the backup. However, if the data set is located on an application pack or a work pack that is subject to ARCHIVE or SUPERSCRATCH but is not backed up through the ABR backup subsystem, then the last reference date would remain as zero, and the data set would never be ARCHIVED or SUPERSCRATCHed based on its last reference date. The ABR DADSM Pre-processing exit prevents this problem by initializing the last reference date to the creation date, at the time a new data set is allocated.

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## 92.60 CONTINUED . . .

**SECURITY  
CONSIDER-  
ATIONS**

For the security system ACF2 (also from Computer Associates), a different approach to security checking is available. The ACF2 system provides a sample VLDEXIT pre-validation exit called ABRVALD, which converts the '#' dsname cataloged by the ABR DADSM Pre-processing exit, back to the original dsname, for validation purposes. This exit is documented in the ACF2/MVS Other Products Manual, in the section on ABR.

**OPTIONS**

By default, the ABR DADSM Pre-processing exit processes as follows:

- It records SCRATCHed data sets in the ABR SCRATCH Catalog.
- It records RENAMED data sets in the ABR SCRATCH Catalog, and clears the ABR backup indicators in the DSCB for the RENAMED data set on disk.
- It records VSAM data sets as well as non-VSAM.
- When recording VSAM data sets, it uses cluster names, not component names.
- It records a maximum of 4 generations of a generation data group (GDG). See the PXNOGDG option below if you wish to change this.
- It attempts to bypass security checking when it catalogs entries into the ABR SCRATCH catalog. This attempt may save some overhead by avoiding some security checks. However, other security checks are still performed; see "Security Considerations", above. (The exit does NOT do anything to change whether the user is allowed to SCRATCH or RENAME the actual disk data set.)
- If it encounters errors, it puts out a maximum of 100 error messages (FDRW90). When this limit is reached, the exit continues to function, but it does not report any more errors until the next IPL (or until the next time the exit is activated by FDRSTART).
- It does not check how long a data set has existed, when recording the data set in the ABR SCRATCH catalog.
- It initializes the last reference date when a new data set is allocated.
- It initializes the last reference date when a data set is extended to a new volume.
- It does not update the last reference date when a data set is RENAMED. (This only matters if the RENAMED data set is never used under the new name.)

Any of the above processing characteristics can be changed, if necessary. However, it is not likely that anyone will want to change any of them except PXNOGDG. If you do want to change others, please call INNOVATION for instructions.

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## 92.60 CONTINUED . . .

The PXNOGDG option for the ABR DADSM Pre-processing exit can be set via the ISPF panel FDR INSTALLATION -- SET ABR DADSM PRE-EXIT OPTIONS (option A.I.4.11.5), or via the FDRZAPOP utility:

**PXNOGDG** Specifies the maximum number of generations of a generation data group (GDG) that are to be kept in the ABR SCRATCH Catalog. The value specified may be an unsigned number from 0 to 255, or a signed number from +0 to +255 or from - 0 to - 255. An unsigned number indicates that for every GDG, the specified number of generations should be maintained in the ABR SCRATCH catalog. A signed number indicates that the number of generations maintained in the SCRATCH catalog for a given GDG is based on the number of generations maintained on disk for that GDG.

If the ABR SCRATCH catalog is an ICF VSAM catalog, then the first time a data set is SCRATCHed from a GDG that is not already represented in the ABR SCRATCH catalog, the ABR DADSM Pre-processing exit will DEFINE a corresponding GDG with the '#' prefix in the SCRATCH catalog. If the PXNOGDG value is unsigned, then the PXNOGDG value will be used directly as the LIMIT for the '#' GDG. The operating system will remove generation N from the SCRATCH catalog when generation N+LIMIT is SCRATCHed. If the PXNOGDG value is signed, then the DADSM Pre-processing exit will read the GDG base entry for the real GDG from the system catalog to find out the LIMIT value for the real GDG, and will add (if PXNOGDG specifies +) or subtract (if PXNOGDG specifies √) the signed PXNOGDG value to calculate the LIMIT value for the '#' GDG. If the calculated value is higher than 255, then the LIMIT will be set to 255. If the calculated value is lower than 1, then the LIMIT will be set to 1. If PXNOGDG is specified as 0 (unsigned zero), then no GDGs will be recorded in the ABR SCRATCH catalog.

Note: If the PXNOGDG value is signed, and the GDG data set being SCRATCHed is cataloged in an OS CVOL rather than an ICF or VSAM catalog, then the DADSM Pre-processing exit will not read the GDG base entry for the real GDG from the CVOL. Instead, the exit will arbitrarily assume that the LIMIT for the real GDG is 4, and will add the PXNOGDG value to 4 or subtract it from 4 to calculate the LIMIT for the '#' GDG.

Examples: Suppose that you DEFINE a new generation data group A.B.C with a LIMIT value of 7, and with the attributes of SCRATCH and NOEMPTY. When generation 8 is created, the operating system uncatalogs and SCRATCHes generation 1 (data set A.B.C.G0001V00). The ABR DADSM Pre-processing exit then DEFINES the GDG #.A.B.C in the ABR SCRATCH catalog, with a LIMIT value as shown in the table below, and catalogs generation 1, as #.A.B.C.G0001V00.

CONTINUED . . .

## 92.60 CONTINUED . . .

When generation 20 is created for the real GDG A.B.C, the operating system uncatalogs and SCRATCHes generation 13. The ABR DADSM Pre-processing exit then catalogs generation 13 into the ABR SCRATCH catalog, and the operating system uncatalogs the generation shown in the table below from the ABR SCRATCH catalog. The number of generations remaining in the ABR SCRATCH catalog will be equal to the #.A.B.C LIMIT value.

If the value of PXNOGDG is	then the LIMIT for #.A.B.C will be	When generation 13 is SCRATCHED and is cataloged into the ABR SCRATCH catalog, the generation deleted from the ABR SCRATCH catalog will be
4 (the default)	4	9
10	10	3
+ 0 or - 0	7	6
+5	12	1
-9	1	12
0	see Note A	not applicable

Note A: If PXNOGDG is set to 0, the exit will not DEFINE #.A.B.C at all, and will not record any SCRATCHed generations.

If the PXNOGDG value is changed, and the ABR SCRATCH catalog is an ICF VSAM catalog, then the change will apply only to new GDGs. Old GDGs will continue to use the LIMIT value that was determined when a data set in that GDG was first cataloged into the SCRATCH catalog and the '#' GDG base was DEFINEd.

If the ABR SCRATCH catalog is an OS CVOL, then the ABR DADSM Pre-processing exit does not create '#' GDG bases, and each SCRATCHed generation is represented in the ABR SCRATCH catalog as an independent data set. When a certain generation N is SCRATCHed from disk, the exit catalogs that generation with the '#' prefix in the SCRATCH catalog, and uncatalogs an earlier generation, N minus limit. The limit value used to calculate the generation number to uncatalog is the PXNOGDG value, if the PXNOGDG value is unsigned. Signed values for PXNOGDG are not supported if the ABR SCRATCH catalog is a CVOL; if the PXNOGDG value is signed, and the ABR SCRATCH catalog is a CVOL, the exit will use a built-in default for PXNOGDG of (unsigned) 4. If PXNOGDG is specified as 255 (unsigned), then the function of uncataloging old generations will be suppressed. If GDGs are not uncataloged by the exit, they will be removed from the ABR SCRATCH catalog in the same way as non-GDG data sets, by the PURGE SCRATCH command of program FDRABRCM ([Section 55.22](#)). If PXNOGDG is specified as 0 (unsigned zero), then no GDGs will be recorded in the ABR SCRATCH catalog.

The default for PXNOGDG is 4; that is, when generation N is SCRATCHed from disk, generation N-4 will be removed from the ABR SCRATCH catalog.

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**92.65 FDRREORG IEBCOPY INTERCEPT**

The FDRREORG IEBCOPY intercept is activated in the system by using the dynamic installation procedure documented in this Section or in [Sections 92.50](#) through [92.52](#).

Once the FDRREORG IEBCOPY intercept is installed, it will automatically invoke FDRCOPY PDS REORG ([Section 21.01](#)) to process IEBCOPY compress-in-place operations without any changes to the JCL and control statements for IEBCOPY.

FDRCOPY PDS REORG will also be invoked when IEBCOPY is executed internally by programs such as SMP and ISPF.

IEBCOPY operations other than PDS compress-in-place are not affected by this intercept.

FDRCOPY PDS REORG optimizes IEBCOPY compress-in-place providing substantial reduction in elapsed time and resource consumption.

IEBCOPY compress-in-place may be executed instead of FDRCOPY PDS REORG by including the following statement in the JCL stream for the job step:

```
//NFDRCOPY DD DUMMY
```

If the IEBCOPY control statements contain an operation other than PDS compress-in-place, control is passed to IEBCOPY and FDRCOPY PDS REORG is not invoked, even for compress-in-place operations which may also be present.

If the step region size is insufficient to satisfy FDRCOPY PDS REORG storage requirement, it will be automatically increased for the duration of the PDS REORG.

LIST=NO is the default if FDR does the compression.

Specify the LIST=YES keyword in the COPY statement if you wish a member list (ex: COPY INDD=DISK1,OUTDD=DISK1,LIST=YES).

\* \* \*

CONTINUED . . .

## 92.65 CONTINUED . . .

Use the following FDRREORG IEBCOPY Intercept installation instructions to activate and test using FDRREORG instead of IEBCOPY for PDS compression.

1. Enable the FDR Global Option IEBCOPY using the FDRZAP utility, as follows:

```
//FDRZAPOP JOB ' FDR GLOBAL OPTI ONS CHANGE UTI LI TY' , FDR
//FDRZAPOP EXEC PGM=FDRZAPOP
//STEPLI B DD DSN=fdr. load. li brary, DI SP=SHR
//SYSLI B DD DSN=fdr. load. li brary, DI SP=SHR
//SYSPRI NT DD SYSOUT=A
//SYSI N DD *
ZAP ENABLE=I EBCOPY
```

Under MVS/ESA, if the FDR load module library is in the LINKLIST, do a MODIFY LLA,RE-FRESH to inform the Operating System that module FDROPT has changed.

2. Dynamically install a test version of the FDRREORG IEBCOPY Intercept for a certain jobname or jobgroup by executing a batch job using the following JCL:

```
//FDRSTRTT JOB ' DYNAMI CALLY I NSTALL I EBCOPY I NTERCEPT'
//FDRSTRTT EXEC PGM=FDRSTART,
                PARM=' TEST, JOBNAME=j obname
                                j obgroup*
//STEPLI B DD DSN=fdr. load. li brary, DI SP=SHR
//SYSLI B DD DSN=fdr. load. li brary, DI SP=SHR
//SYSUDUMP DD SYSOUT=A
```

See Note 1

See Note 2

See Note 2

This JCL is supplied in member FDRSTRTT in the Installation Control Library (loaded as described in [Section 92.03](#) or [90.02](#)).

Once the FDRREORG Intercept is installed, normally, it need not be deinstalled. In case deactivation is desired, run program FDRPARE using same JCL as in Item 2.

Note 1: On the EXEC statement, JOBNAME= specifies the job(s) that are to be processed by the test version of the exits. JOBNAME= may be abbreviated as JOB=. The value specified may be either a single jobname, or a group name specified as a jobname prefix followed by an asterisk (\*). TSO userids and started task names will also be checked for a match and will be eligible for processing by the test version of the exits. Any job that does not match will be processed by the system version of IEBCOPY.

Note 2: STEPLIB and SYSLIB are not needed if the FDR load library is in the LINKLIST.

3. Test the FDRREORG IEBCOPY Intercept by executing IEBCOPY to compress a PDS, verify that the SYSPRINT output contains FDR messages, instead of IEBCOPY messages. Include a STEPLIB DD pointing to the FDR load library unless it is in the LINKLIST. Next, include an //NFDRCOPY DD DUMMY in the JCL stream and rerun the job to verify that IEBCOPY is successfully invoked.
4. Once the FDRREORG IEBCOPY Intercept is tested, place the FDR load module library in a LINKLIST library that is APF authorized.
5. To install FDRREORG IEBCOPY Intercept as part of each IPL, put the following record (starting in column 1) into an IEFSSNxx member in data set SYS1.PARMLIB:

```
FDR, FDRSTART
```

You may either add this record to an existing IEFSSNxx member, or put this record into a new IEFSSNxx member and add the new member's suffix to the SSN= parameter in IEASYSxx. This IEFSSNxx record will cause the FDRSTART program to run during every IPL, as a subsystem initialization routine, to dynamically install the FDR/ABR Operating System exits.

In the current release, FDR/ABR will not actually be started as an MVS subsystem.



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### PROGRAM MODULES WHICH ARE EXECUTED AND THEIR FUNCTION

FDR	DUMPS OR RESTORES FULL VOLUMES.
FDRABR	PROVIDES AN EFFICIENT AND EASY-TO-USE METHOD OF MANAGING SPACE ON DIRECT ACCESS VOLUMES. INCREMENTAL BACKUP, ARCHIVING AND SIMULATION ARE SUPPORTED.
FDRABRM	PROVIDES THE USER THE ABILITY TO INITIALIZE DISK VOLUMES AND DATA SETS FOR ABR PROCESSING.
FDRABRP	OFFERS THE USER A VARIETY OF REPORT TYPES.
FDRABRCM	ALLOWS THE USER TO PURGE ENTRIES FROM THE ABR SCRATCH CATALOG THAT HAVE EXPIRED OR ARE WITHIN A SPECIFIED DATE RANGE. ALSO PURGE BACKUP DATA SET ENTRIES FROM THE ABR CATALOG.
FDRABRUT	WILL MARK DATA SETS OR GROUP OF DATA SETS TO BE ARCHIVED, OR TO BE PROCESSED BY ABR. REQUEST THE RESTORE OF DATA SETS FROM THE ARCHIVE SUB-SYSTEM OR FROM THE BACKUP SUB-SYSTEM.
FDRARCH	PROVIDES THE USER THE CAPABILITY TO PERFORM SELECTED MAINTENANCE FUNCTIONS TO THE ARCHIVE CONTROL FILE.
FDRCONVT	CONVERTS DATA SETS TO SMS MANAGEMENT IN PLACE.
FDRCOPY	DATA SET COPY OR MOVE DASD TO DASD.
FDRCPK	IS A DISK MANAGEMENT UTILITY PROGRAM WHICH WILL REORGANIZE DASD.
FDRDSF	DUMPS FROM ONE OR MORE DISK VOLUMES BY DATA SET OR PHYSICAL DISK SEGMENT. RESTORES FROM DSF BACKUP TAPES AND FROM FULL PACK FDR BACKUP TAPES.
FDREPORT	WILL DISPLAY OR PRINT INFORMATION ABOUT DATA SETS, ENTIRE DISK VOLUMES OR ENTIRE INSTALLATIONS.
FDRREORG	PROVIDES AN AUTOMATED METHOD OF REORGANIZING VSAM, IAM AND PDS DATA SETS.
FDRQUERY	PRODUCE REPORTS SHOWING SAVINGS THAT WOULD RESULT FROM INCREMENTAL BACKUP VERSUS FULL VOLUME DUMPS AND REPORTS TO SHOWN HOW MUCH DISK SPACE CAN BE SAVED BY ARCHIVING DATA SETS WHICH HAVE NOT BEEN REFERENCED FOR A PERIOD OF TIME.
FDRTCOPY	COPIES FDR/DSF/ABR FORMATTED TAPES.
FDRZAPOP	GIVES THE USER A METHOD OF MODIFYING GLOBAL OPTIONS AND ENABLING SECURITY OPTIONS. SAR IS A SELF-LOADING, STAND ALONE RESTORE AND BACKUP PROGRAM. CAN BACKUP AND RESTORE DASD VOLUMES WHEN AN OPERATING SYSTEM IS NOT AVAILABLE.

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20	DATA SET FUNCTIONS (DSF)
21	FDRCOPY
25	FDRREORG
30	STAND ALONE RESTORE (SAR)
40	COMPAKTOR (CPK)
50	AUTOMATIC BACKUP & RECOVERY (ABR)-BACKUP SUB-SYSTEM
51	ABR ARCHIVE SUB-SYSTEM
52	FDR/ABR SPECIAL CONSIDERATIONS & ICF VSAM CONSIDERATIONS
53	ABR REPORT FACILITIES
55	ABR VTOC, ARCHIVE MAINTENANCE & ABR CATALOG PURGE
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